

Understanding Shifts in Population Health-Seeking Behavior  
Created by Financial Incentive Reform Initiatives:  
The Impact of India's Janani Suraksha Yojana Conditional Cash  
Transfer Program

Ritika Jain<sup>1</sup>

*Professor Manoj Mohanan, Faculty Advisor*

*Professor Alison P. Hagy, Seminar Advisor*  
*Professor Kent Kimbrough, Seminar Advisor*

---

Duke University  
Durham, NC  
2015

---

<sup>1</sup> Ritika graduated in May 2015 with a B.S. in Economics with Distinction and a minor in Global Health. Following graduation, she will begin full-time with Accenture in Atlanta. She can be reached at [ritikajain@gmail.com](mailto:ritikajain@gmail.com).

**Acknowledgements**

I wish to thank Professor Manoj Mohanan for his extensive knowledge and support throughout the creation of this paper. His expertise was a guiding force through this challenging process. I would also like to thank Professor Kent Kimbrough and Professor Alison P. Hagy for their feedback on my many drafts and presentations as a part of the honors seminar class. Lastly, I am grateful to my peers, professors, and advisors who have made my Duke experience and research both inspiring and engaging.

**Abstract**

Demand-side financing is a policy tool used by nations to incentivize the utilization of health institutions, and India's Janani Suraksha Yojana (JSY) is one of the largest such financial incentive programs in the world. The program pays eligible pregnant women to deliver their babies in institutions partnered with the program. This paper analyzes the program's impact through observed shifts in population delivery-seeking behavior created by the introduction of the JSY program in a district and the receipt of JSY payments. This is done through two measures: institutional delivery rates and out-of-pocket expenditure (OOPE) for delivery. Using data from the most recent wave of India's District-Level Household Survey conducted in 2007-08, this paper finds that the overall introduction of the program in districts in India does not lead to significant changes in institutional delivery or out-of-pocket expenditure outcomes for mothers delivering between 2004-08. Further analysis of subpopulations shows that marginalized populations are responsive to JSY introduction in their district, with a 1.10 – 3.40 percentage point increase in the probability of delivering in-facility. Lastly, analysis of receiving JSY payments shows that utilization of the program leads to a 1.34 percentage point increase in the probability of incurring OOPE, but a 4.81 percent decrease in the amount of OOPE incurred. The JSY is helping to reduce overall out-of-pocket spending on deliveries. However, results also suggest that the majority of program benefits are not reaching poor pregnant women as the JSY aims, communicating the need for improvement in population targeting.

*JEL classification: C22, I12, I18*

**Keywords:** maternal health, demand-side financing, conditional cash transfer, healthcare reform, difference-in-differences, difference-in-difference-in-differences

## **I. Introduction**

India has taken strides to finance health interventions in the midst of global health care reform, much of which began in the 1990s. One of the nation's leading initiatives is the Janani Suraksha Yojana (JSY), a conditional cash transfer (CCT) program with the aim of promoting institutional deliveries among poor pregnant women. In the 2007-08 year, closest to this paper's study period, JSY expenditures were 8.8 billion rupees or \$207 million in reaching 7.1 million individual beneficiaries, making it one of the largest CCT programs in the world. This paper aims to better understand how the JSY impacts population health-seeking behavior, and whether it achieves its goal of incentivizing the utilization of, and thus improving access to, health services for population segments.

Low health spending and poor health outcomes in developing nations, combined with globalization and an international commitment to reducing world poverty, have motivated funding for health initiatives such as the JSY. Developing nations account for 84 percent of the global population and 90 percent of the global disease burden, but only 12 percent of all health spending (Gottret & Schieber, 2006). In addition, spending does not always reach the population's poorest segments, leaving them with disproportionately poor health outcomes. The United Nations established the Millennium Development Goals (MDGs) in 2000 as an effort to slash poverty, hunger, and disease by 2015. Goal number five, to improve maternal health by reducing the maternal mortality ratio by three quarters and achieving universal access to reproductive health by 2015, is particularly relevant to India's JSY. As the MDGs mold into the UN's Sustainable Development Goals in September 2015, policymakers around the world are reflecting on development efforts such as the JSY.

Financial incentive policies reward individuals for exhibiting behaviors that are investments in their human capital. These demand-side programs aim to increase the proportion of the population utilizing a service, and increased utilization is expected to result in better development outcomes. One example of a financial incentive is a conditional cash transfer (CCT) program, which provides cash to a segment of the population, conditional on an investment in human capital. CCTs have been used for education, nutrition, and health reform in several countries around the world, including

Mexico, Nicaragua, Ecuador, Jamaica, Honduras, Colombia, Brazil, and Chile. The Janani Suraksha Yojana (JSY) is a CCT introduced in India 2005. The program provides cash to women who give birth in a health institution, with the assumption that the quality of delivery care is superior in health facilities and will subsequently lead to better health delivery outcomes for mothers, and lower national neonatal and maternal mortality rates. In addition to the program's considerable size, expectations that India will be the world's most populous nation by 2025 with a large presence in the world economy substantiate the importance of the country's health policies, and by the same token, the success of initiatives like the JSY in meeting their goals.

Since the implementation of the JSY in 2005, the third round of the District Level Household Survey (DLHS) was conducted throughout India in 2007-08 with the purpose of gathering data to measure the effects of the program. A number of studies have used data from waves of the DLHS to understand changes in patterns of Indian reproductive health. Lim et al. (2010) was the first to analyze the impact of the JSY on reproductive health outcomes, and Mazumdar, Mills, & Powell-Jackson (2011), and Carvalho, Thacker, Gupta & Saloman (2014) followed with different methods of impact analysis and the study of additional health outcomes. These papers have focused on changes in institutional delivery rates, and primary health outcomes, such as maternal mortality, prenatal care, antenatal care, and neonatal mortality.

This paper works to understand the impact of the JSY on population delivery-seeking behavior through two factors, changes in institutional delivery rates and out-of-pocket expenditures (OOPE) for delivery. Specifically, this paper strays away from past literature on the JSY that analyzes its welfare impact on population health outcomes, and instead understands substitution effects created by the program to deliver in an institution, with reference to delivery OOPE, an outcome that has not been previously understood through JSY impact analysis. Additionally, this paper contributes both difference-in-differences and difference-in-difference-in-differences regression models, adding an analysis of the impact of the program on subpopulations to the existing literature. This methodology allows for a discussion of population substitution effects created by the financial incentive program regarding delivery-seeking behavior.

The overall impact of introducing the JSY in a district on both institutional deliveries and OOPE is found to be insignificant. This is primarily due to drastic changes in the program's population coverage in a district, even after it is introduced, suggesting the need for improvement in the management of the program on the district-level and ensuring satisfaction among mothers who receive JSY assistance. Through further analysis of subpopulations, this paper finds that marginalized populations such as poor households, those in a scheduled caste or tribe, rural households, and mothers without education have a greater probability of delivering in-facility with JSY introduction in comparison to other populations. This communicates that marginalized populations are responsive to the JSY cash incentive. Finally, a relationship between financial incentive programs and out-of-pocket expenditures is established. It is found that receiving JSY assistance leads to a 1.34 percentage point increase in the probability of incurring out-of-pocket expenditures, but a 4.81 percent decrease in the amount of OOPE incurred. This suggests that the reduced cost implications of JSY utilization among households who were already paying out-of-pocket for delivery is greater in comparison to the additional costs incurred by mothers substituting away from costless delivery at home to delivering in-facility. The program is decreasing overall OOPE for women, however it can improve targeting of its benefits to the poorest population segments.

This paper is organized as follows: Section II outlines relevant background information relevant to the topic, including healthcare in India, maternal and child health outcomes, and details of the JSY program; Section III discusses existing literature relevant to this paper; Section IV describes economic theory behind incentive programs and substitution effects; Section V reviews the data used for empirical analysis; Section VI sets up the empirical methods and discusses results; and finally Section VII concludes the analysis with relevant program and policy implications. Additional tables can be found in the appendices of this paper.

## II. Background

### A. Healthcare in India

A study of healthcare in India by the International Monetary Fund found three main features of the Indian healthcare system: low levels of public spending; a resulting poor quality of preventative care and poor health status of the population; and an inadequate level of public health provision resulting in high out-of-pocket (OOP) spending (Coady, 2012). India's healthcare system has one of the lowest levels of public funding in the world. Its public health expenditure as a percentage of GDP was 1.3 in 2012, in comparison to the United States' 8.3 percent the same year. Table 1 below shows health expenditure data for India and four comparable nations, Brazil, Russia, China, and South Africa. These five nations are known as the BRICS nations for their large populations, fast-growing economies, and influence on regional and global affairs. The data communicates the worst health spending indicators for India in comparison to the other BRICS nations.

TABLE 1  
Health Spending Across BRICS Nations

Indicator	India		Brazil		Russia		China		South Africa	
	2004	2012	2004	2012	2004	2012	2004	2012	2004	2012
Health spending per capita (\$)	29	61	257	1,056	212	887	70	322	410	645
Total health expenditure (% of GDP)	4.5	4.1	7.1	9.3	5.2	6.3	4.8	5.4	8.9	8.8
Public health expenditure (% of GDP)	0.9	1.3	3.4	4.3	3.1	3.8	1.8	3.0	3.3	4.2
Private health expenditure (% of total health expenditure)	79.1	66.9	53.0	53.6	40.4	39.0	62.0	44.0	63.4	52.1
Out-of-pocket expenditure (% of total health expenditure)	71.6	57.6	33.2	31.0	33.2	34.3	53.6	34.3	18.4	7.2

Source: World Bank, World Health Organization

Low levels of public spending have led to subpar public facilities and a subsequent dependence on the private sector. According to the National Family Health Survey conducted in 2005-06, over 70% of households in urban areas and 63% of households in rural areas depend on the private health sector as their primary source of health care. Utilization of public health facilities is largely by the poorest segments of the population, who cannot pay the high OOP costs for care in private facilities. However, the financial burden of OOP health costs exists across facilities, especially for the poor. Out-of-pocket expenditure is more than four times higher than public spending on health care, and these costs alone are estimated to push 2.2% of the population below the poverty line each year (Coady, 2012; Country Cooperation Strategy At a Glance: India). High OOPE has a ripple effect on future outcomes. The Asian Development Bank found that even the most basic OOPE for home-based, maternal care, is catastrophic<sup>2</sup> for virtually all poor households in India. To save money, such households turn to common coping strategies, such as “buying cheaper but less nutritious food, taking girls out of school, further delaying health care, or self medicating” which only further undermine their health and development outcomes (Anderson, 2011).

The portion of the population that does utilize the public sector is presented with a hierarchical system of facilities. The public sector consists of sub-centers (SCs), primary health centers (PHCs), community health centers (CHCs), and district hospitals (DHs). In urban areas, there are only urban health centers (UHCs) and district hospitals (DHs). Sub centers are the first point of contact between health workers and the community. Primary health centers are the first point of contact between doctors and the community. They have about 4-6 beds and act as referral units for 6 sub centers. Curative, preventive, and promotive health services are all offered at PHCs. Lastly, community health centers act as referral centers for four PHCs, with around 30 beds and superior technology facilities. The national norms of population coverage for SCs, PHCs, and CHCs respectively are 5000, 30,000, and 120,000 in plain areas and 3000,

---

<sup>2</sup> Catastrophic expenditure is defined as a significantly high OOPE that can push a household into poverty. Previous literature has measured catastrophic health expenses in a variety of ways, including: a percentage of household income, the level of expenditure necessary to purchase food, its ratio to nonfood expenditures, and more. This paper does not define its own level of “catastrophic” expense.



20,000, and 80,000 in hilly or tribal areas (Majumder, 2004). These facilities all offer delivery care for pregnant women, and data from all are included in this paper's sample.

### *B. Maternal and Child Health*

India is the world's second most populous nation and is expected to surpass China as the most populous country by 2025 (Roberts, 2009). Yet, the Indian population exhibits some of the world's poorest health outcomes, inclusive of maternal and child health. In 2014, the World Health Organization (WHO) estimated that out of the 536,000 maternal deaths occurring globally each year, 136,000 of these occur in India. This is just over 25% of the world's maternal deaths, while India only accounts for 17.5% of the world's population (Population of India – 2014, Worldometers). The national target, in line with the Millennium Development Goals, is to reduce the maternal mortality ratio to less than 100 per 100,000 live births. Although the maternal mortality ratio has reduced from 280 in 2005 to 190 per 100,000 live births in 2013, India is still far from its target. One hypothesized method of reducing the mortality ratio is to better outcomes of antenatal care, institutional deliveries, and postnatal care.

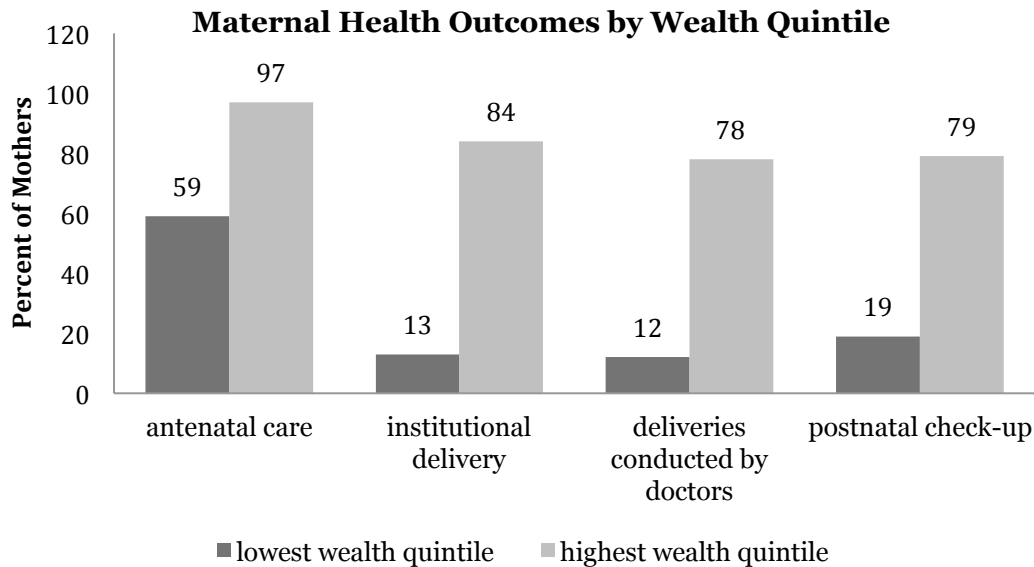
The focus of this paper is on institutional deliveries, which are defined as births that occur in a medical facility. Deliveries that occur in institutions are expected to lead to a decline in maternal and newborn deaths, given better quality care, access to drugs, and the presence of health professionals. Previous research has identified supply- and demand-side factors that act as barriers to mothers' utilization of delivery care in India. On the supply side, these include the availability of health facilities and accessibility to these facilities, the presence of a female doctor, and the availability of drugs. Maternal education, household economic status, caste<sup>3</sup>, tribe<sup>4</sup>, and religion all influence delivery demand (Mohanty & Srivastava, 2012). Supply-side factors differ considerably across institution and location, and demand-side factors across household demographics and geographic location. Data from the National Family Health Survey (NFHS) conducted in

---

<sup>3</sup> India's caste system is one of social stratification that places people in occupational groups. Members of *scheduled* castes are the lowest castes in society and protected by the government through special concessions.

<sup>4</sup> The Indian government has defined existing tribes, and *scheduled* tribes are treated together with scheduled castes as a backward class.

waves across India communicate disparities in maternal health outcomes across education levels, socioeconomic levels, and Indian states. Figure 1 compares the proportion of women who exhibit delivery-related maternal health care indicators in the lowest and highest wealth quintiles.



**Figure 1:** Maternal health outcomes by wealth quintile, Source: NFHS-3

The proportion of women who deliver in-facility is almost 6.5 times higher for households in the highest wealth quintile in comparison to the lowest. This communicates a large disparity in the utilization of and access to health services across household wealth status. Table 2 displays how maternal and child health outcomes have changed over time through three rounds of the NFHS. Institutional delivery rates have been increasing over time, from 26 percent in 1993 to 40 percent in 2006. While giving birth is generally less expensive at public facilities, the percentage of deliveries at private health centers has increased from 11 percent to 20 percent from 1993 to 2006 in comparison to the increase of deliveries in public health facilities from 15 percent to 18 percent. Greater utilization of private health facilities can be attributed to several factors, including better quality of care, greater accessibility of facilities, a lack of services and drugs at public centers, and/or improvements in the standard of living of the population (Mohanty & Srivastava, 2012). Deliveries by health professionals are also a focus of health reform, and have shown similar increases since 1993. Doctors,

ANM/nurse/midwife/LHV<sup>5</sup>, and other health professionals are considered to be skilled birth attendants. A dai<sup>6</sup> and others, including relatives and friends, are not.

TABLE 2  
Maternal Health Indicators Overtime

Indicator	NFHS-1 1993	NFHS-2 1999	NFHS-3 2006
Place of delivery			
Institutional deliveries	26	34	40
Domiciliary deliveries	74	66	60
Institutional deliveries			
Public	15	16	18
NGO/trust	NA	0.7	0.4
Private	11	17	20
Type of delivery			
Vaginal deliveries	97	93	91
Caesarean sections	3	7	9
Assistance during delivery			
Doctor	22	30	35
ANM/nurse/midwife/LHV	13	11	11
Other health professionals	NA	1	1
Dai (TBA)	35	35	37
Other	30	23	16

There are several maternal and child health issues that health funding can target. Reform can aim to reduce the gap in outcome disparities for the poor, increase the overall utilization and access to services for the population, or improve the quality of public health services to achieve better health outcomes.

### *C. Janani Suraksha Yojana*

Poor maternal and child health outcomes in India started gaining recognition in the early 1990s with the Child Survival and Safe Motherhood program, which shifted the focus of health policy to issues of reproductive health (Mazumdar, 2011). The National Maternal Benefit Scheme (NMBS) also began in the 1990s as an unconditional cash transfer program, which has since transformed into the Janani Suraksha Yojana (JSY). The NMBS provided 500 Rs (\$11) per birth for BPL women over 19 years of age, for up to two live births. This scheme was replaced with an incremental approach to implement the JSY, based on a scale of assistance and categorization of states and territories.

<sup>5</sup> ANM = auxiliary nurse midwife, works along a qualified medical nurse and also acts as a midwife, or caregiver and adviser during pregnancy, delivery, and postpartum; LHV = lady health visitor, handpicked nurse or one recruited on contractual terms.

<sup>6</sup> A dai is a woman in an Indian village who traditionally delivers babies, she is a traditional midwife.

The JSY was implemented as a subset of the Indian government's National Rural Health Mission (NRHM) in 2005. The NRHM was launched as a seven-year initiative to increase public health spending, with the aim of providing accessible, affordable, and quality health care to the rural population. The program put a female health volunteer in each village, called an accredited social health activist (ASHA). These activists encourage the use of NRHM's programs among below poverty line (BPL) women, including the JSY. The JSY focuses on improving institutional delivery outcomes for India's poor through a conditional cash transfer completely funded by the central government. The government's cash incentive is intended to pay for nutrition and transportation costs that households generally pay OOP when delivering in-facility. When a mother arrives at a hospital partnering with JSY, the cost of her delivery is free, including caesarean section deliveries and deliveries with emergency complications. The cash incentive is then supposed to be disbursed to the mother effectively at the institution itself. The program partners with public health centers and some accredited private health centers.

Although the JSY is a centrally funded program, its implementation differs across areas in India. The 34 Indian states and provinces differ in terms of their classification under the JSY program, institutional delivery rates, and JSY assistance percentages. The JSY program divides Indian states and provinces into four groups: High Focus Non-Northeast, High Focus Northeast, Non-High Focus Large, and Non-High Focus Small. Among the ten high focus non-NE areas, the first eight shown in Table 3 are classified as the Empowered Action Group (EAG) states. These states all had institutional delivery rates below 25% in the 2002-04 data collection period, and account for about half of India's population but two-thirds of maternal deaths (Nath, 2011). Implementation of the JSY was prioritized in high focus states first. High and non-high focus states also differ in JSY eligibility requirements and reimbursement rates. All women in high focus regions are offered the cash incentive, while only women in low focus regions who are below the poverty line and over 19 years of age, or are in a social caste or tribe, and have had two or fewer births are eligible. Women in high focus regions receive 1,400 Rs (\$31) in rural and 1,000 Rs (\$22) in urban areas. In low focus regions, they receive 700 Rs (\$16) in rural and 600 Rs (\$13) in urban areas. To put these numbers into context, India's Gross National Income per capita in 2007 was \$1000.

TABLE 3  
Institutional delivery and JSY assistance percentages across Indian states

Classification	State	Institutional Delivery (%)		JSY assistance (%, 2005-08)
		2007-08	2002-04	
High Focus - Non NE	Jharkhand	17.8	21.2	2.8
	Chhattisgarh	18.1	18.1	9.3
	Uttar Pradesh	24.5	21.4	4.6
	Bihar	27.7	18.8	9.7
	Uttarakhand	30	24	9.6
	Orissa	44.3	30.8	31.9
	Rajasthan	45.5	30.3	31.9
	Madhya Pradesh	47.1	28.7	34.9
	Himachel Pradesh	48.2	45.1	5.9
High Focus - NE	Jammu & Kashmir	55	-	2.8
	Meghalaya	24.4	32.5	3
	Assam	35.3	23.2	25.2
	Manipur	41.1	46.2	6.3
	Tripura	46.3	61.1	12.2
	Sikkim	49.8	57.8	25.6
	Mizoram	55.9	52.6	27.1
	Arunachal Pradesh	56.5	52.2	9.5
	Non High Focus - Large	Haryana	46.9	35.7
West Bengal		49.2	47	19
Punjab		63.3	48.9	2.7
Maharashtra		63.6	57.9	8.3
Karnataka		65.1	57.9	14.4
Andhra Pradesh		71.8	59.4	22.1
Gujurat		73.6	47.4	1
Tamil Nadu		94.1	86.2	28.3
Goa		96.3	91.2	1.8
Kerala		99.4	97.6	15.3
Non High Focus - Small		Drada & Nagar Haveli	46	45.9
	Daman & Diu	64	68.1	2.2
	Delhi	68.6	50	3.1
	Chandigarh	73.6	47.4	1
	Andaman & Nicobar	76.3	75.5	5.2
	Lakshadweep	90.3	79.9	3
	Puducherry	99.1	97.2	9.8
<i>Averages by State Classification</i>				
High Focus - Non Ne		35.8	26.5	14.3
High Focus - NE		44.2	46.5	15.6
Non High Focus - Large		72.3	62.9	11.8
Non High Focus - Small		74.0	66.3	4.0

Table 3 shows the classification, institutional delivery rates, and JSY assistance percentages across states and provinces in India. It displays two features that are relevant to this paper: the existing disparities in institutional delivery rates across states in India, and how the JSY has shaped its policies to target certain states and districts with their cash incentive because of this. Institutional delivery rates before the introduction of the JSY ranged from 18.1 to 97.6 percent. The percent of mothers who

received financial assistance under the JSY program since its implementation range from 1 to 34.9 percent. These gaps also exist at the district<sup>7</sup> level within states. The JSY classified states, and further districts, to introduce the program by geographic location at different times, targeting populations with the poorest delivery outcomes and largest populations first. This resulted in high utilization of the program in some areas, but much smaller utilization in others when the national survey was conducted in 2007-08. The difference-in-differences model that this paper employs to understand the impact of the JSY factors in different introduction times of the JSY, allowing for district comparison across time-sensitive JSY implementation.

In addition to disbursing cash to mothers for delivering at institutions partnered with the JSY, the program also provides cash payments to social health workers. These workers are offered 200 Rs (\$4) for deliveries in urban areas and 600 Rs (\$13) for those in rural areas. JSY also pays 500 Rs (\$11) to BPL women for up to two live births at home. This provides women who have strong cultural preferences to deliver at home with cash assistance for medical care during their delivery or for other delivery expenses.

The number of JSY beneficiaries started as 0.74 million in 2005-06 and increased to 10 million in 2009-10, covering about 40% of total deliveries in India. Its budgetary allocation has also shifted from \$8.5 million in 2005-06 to \$275 million in 2008-09 (Modugu, 2012). The JSY's immense funding and coverage of deliveries make it an ideal model to analyze the impact of financial incentive programs in developing nations. This paper aims to understand the impact of the JSY through two facets: institutional deliveries and out-of-pocket expenditures on deliveries. An examination of the literature on the impact of the JSY and economic theory behind financial incentive programs puts this paper into the greater context of financial incentive program analysis.

---

<sup>7</sup> Districts are geographic units within states. Some districts are also divided into sub-divisions, which can then be divided into blocks.

### III. Literature Review

Researchers have been studying the success of CCTs in meeting their goals of health, education, and nutrition reform. Lim et al. (2010), Mazumdar, Mills, & Powell-Jackson (2011), and Carvalho, Thacker, Gupta & Saloman (2014) all establish causality in their studies of the impact of the Janani Suraksha Yojana program on various maternal and child health outcomes. This review also considers studies on other financial incentive programs that analyze delivery and OOPE outcomes. Mohanan et al. (2013) looks at the impact of the Chiranjeevi Yojana, implemented in a single state in India, on a variety of maternal health outcomes and out-of-pocket expenditure. These studies make up the most relevant existing literature to this paper, and point to the remaining gaps in JSY impact analysis, some of which this paper hopes to fill.

Lim (2010) was the first study conducted on the impact of the JSY program. They use data from the DLHS-2 and DLHS-3 surveys in 2002-04 and 2007-08, respectively, to understand the impact of the JSY program on institutional delivery rates and maternal mortality. Exact matching, with versus without, and district level difference-in-differences are all empirical methods used in analysis. A criticism of the study is that its methodology does not account for the fact that women self-select into the program, since receiving JSY payment is not a randomized treatment in the population. This makes the probability of receiving JSY treatment endogenous in the analysis. Lim concludes that the poorest and least educated women did not always have the highest odds of receiving JSY payments, and recommends an improvement in targeting. They find that financial assistance from the JSY is associated with a 43% increase in the probability of giving birth in a facility. This outcome is not as high for other maternal health outcomes such as the probability of receiving antenatal care and delivering with a skilled birth attendant. The study's analysis of the JSY's impact on health outcomes such as perinatal, neonatal, and maternal mortality rates are inconclusive. They argue that their sample is not powerful enough to detect changes in these health outcomes.

After Lim (2010), Mazumdar (2011) was the next paper to analyze the impact of the JSY program. This paper uses a different empirical methodology. They employ a difference-and-differences method with an instrumental variable, a measure of JSY coverage. Their

main outcomes are institutional delivery rates and neonatal mortality. The study's use of an instrumental variable allows them to factor into their analysis incomplete implementation of the program in districts. JSY coverage is a measure of the proportion of women who give birth in a public health facility and receive the JSY financial incentive. Thus, full coverage means that every woman who gives birth in a public facility receives the JSY. At full coverage, the paper finds that JSY introduction leads to a 12-percentage point increase in the utilization of a health facility, and a 19-percentage point increase in the utilization of a public health facility for birth. They find no significant association between the introduction of the JSY and neonatal mortality.

Carvalho (2014) studies the impact of the JSY on a different set of health outcomes: child immunizations, post-partum care, breastfeeding practices, and care-seeking behaviors. They use a propensity score matching methodology for their analysis. This matching process has been used in other studies on conditional cash transfer programs, such as education programs in Mexico, Uruguay, and Brazil, and works well for observations that do not randomly receive the treatment of interest. The study finds that financial assistance from the JSY leads to a significant increase in immunization rates of 3-9 percentage points for various diseases, postnatal check-ups of 26-27 percentage points, and no significant effect on breastfeeding or care-seeking behaviors for sick children. This study does not test the impact of the program on institutional delivery outcomes.

Distinct from other literature specific to the JSY, Mohanan (2013) looks at a different financial incentive program implemented in a single state in India. Mohanan analyzes the impact of the Chiranjeevi Yojana, a public-private partnership introduced in 2006. The program provides a reimbursement to cover the costs of delivery for BPL women who choose to give birth at select private-sector hospitals. This program differs from the JSY in that it makes payments to health providers for deliveries and travel reimbursements, instead of directly to the households. The study uses a difference-in-differences methodology to compare institutional delivery and OOPE outcomes in districts where the program has been implemented to those where it has not. They find that implementation of the program has no association with changes in the probability



of delivering in-facility or with any change in household expenditure on deliveries. Their research shows that the self-selection of women into the program and the substitution away from delivering in private institutions instead of from delivering at home are central to the overstatement of the program's impact in other papers.

Mohanan's empirical methodology is relevant to this paper. The difference-in-differences regression on institutional deliveries and OOPE is the basis for the analysis of this paper. Previous literature on the JSY has used varying methods of impact analysis to study the impact of the JSY on several maternal and child health outcomes. Within the scope of the research goals and methods of these past studies, this paper adds to the existing literature on JSY in two ways, (1) by employing a unique empirical method to understand the JSY impact on institutional deliveries, first through a difference-in-differences methodology and then an expanded difference-in-difference-in-differences method, and (2) by exploring the impact of the program on an additional indicator, out-of-pocket health expenditure. This methodology allows for the analysis of population delivery-seeking behavior, understanding which population segments substitute toward JSY funded in-facility deliveries. This is further explored through following sections of this paper.

#### **IV. Theoretical Framework**

This section discusses the theory behind financial incentive reform initiatives and their expected impact on the utilization of an incentivized service. Then, theory behind changes in out-of-pocket expenditure and its role in understanding substitution effects is discussed.

Conditional cash transfer programs like the JSY incentivize the utilization of a service, conditional on a change in behavior. Mothers who are eligible to receive JSY benefits in states across India have to deliver their babies in a facility partnered with the JSY to receive the cash disbursement. The financial incentive motivates any eligible mother who believes that the cash incentive is greater than the additional economic costs of complying with the condition. The JSY aims to promote institutional deliveries among poor pregnant women. However, the cash disbursement is an incentive for all eligible mothers, regardless of whether they normally deliver at home or not. Households that deliver at home may do so because of: high costs of in-facility delivery, high transportation costs to far away facilities, poor quality of care in accessible facilities, or a preference of traditional home deliveries. Households that lack financial resources additionally tend to heavily discount the future benefits of in-facility deliveries, or do not acquire perfect information about the benefits of the health service. Financial incentive programs work as pricing mechanisms to exceed any additional costs or conflicting preferences, and to place value on the future benefits of delivering in-facility.

CCT programs seek to bring about changes through two causal pathways: income effects through a cash disbursement, which include lifting the liquidity constraints that prevent low-income households from undertaking human capital investments, and substitution effects toward investing in human capital, reflecting the increased opportunity costs of not investing in the condition of the CCT program (Kabeer, Piza & Taylor, 2012). This paper focuses on observing the impact of the JSY on the substitution toward delivering in-facility. This is observed through two measures, changes in institutional delivery rates and changes in out-of-pocket expenditure outcomes for delivery, both the probability of incurring OOPE and the amount of OOPE incurred for delivery.

The basic expectation is that a financial incentive should lead to an increase in the utilization of delivery facilities partnered with the JSY because households are being paid to consume the service. Assuming that the cash incentive covers the additional costs of delivering in-facility, there are other demand and supply side factors to consider. On the demand side, the short-term value of cash, cultural delivery preferences, and unanticipated costs can impact mothers' delivery-seeking behavior. The condition of delivering in an institution partnered with the JSY to receive the cash disbursement may incentivize some mothers to become pregnant to gain access to cash. Particularly, low-income households may drastically shift their behavior to receive extra cash in the short run. Other mothers may not substitute toward in-facility delivery as expected due to a deep-rooted value in traditional deliveries. Lastly, the JSY cash disbursement may not be enough to cover unexpected costs or corruptive behavior on the supply side. Additionally on the supply side, quality of in-facility delivery services and the ability of facilities to increase the supply of their services to meet incentivized demand influence delivery-seeking behavior. Most facilities partnered with the JSY are public, with an assumed lower quality of care in comparison to private facilities, but a higher quality than costless home delivery without a skilled birth attendant. These factors are important when considering why mothers may or may not be substituting toward the incentivized service by the JSY program.

Substitution toward in-facility deliveries created by the JSY program can be observed through changes in out-of-pocket expenditure outcomes. Out-of-pocket expenditures on deliveries can include costs for skilled birth attendants, hospital stays, drugs, transportation to a facility, and nutrition. Generally, these expenditures are considered investments in a healthy delivery and it is assumed that these costs are associated with better delivery outcomes, regardless of the location of delivery. For example, a mother may pay for drugs, nutrition, and a skilled birth attendant to deliver her baby at home. In comparison to another mother's costless home delivery, both this mother's OOPE and expected health outcomes are superior. Out-of-pocket expenditure outcomes can therefore help understand substitution toward healthier delivery. Consider mothers divided into three groups: those who are delivering (1) in higher cost private facilities, (2) in JSY-partnered public facilities, (3) at home for almost no cost. For each of these

groups, reasons why mothers may or may not substitute toward deliveries through the JSY can be discussed, but they cannot be empirically tested due to limited data on the quality of care on the supply side, as well as JSY cash disbursement amounts, total household income, and mother's preferences on the demand side. Instead, the assumption that mothers are substituting toward deliveries through the JSY program allows for an analysis of expected shifts in OOPE outcomes. Mothers delivering in private facilities are incentivized to substitute toward delivering through the JSY for less expensive, but possibly lower quality of delivery. For these mothers who do substitute toward the JSY program, there is no expected change in the probability of incurring OOPE, since they are already paying out-of-pocket for delivery in private institutions, but there is an expected decrease in the amount of OOPE incurred. Mothers who are already delivering at public facilities are incentivized to deliver through the JSY for the cash disbursement. The expectation is that neither the probability of incurring OOPE nor the total amount of delivery OOPE will change for these mothers, because they are not changing their delivery-seeking behavior. Lastly, mothers who normally deliver at home may receive higher quality of care by delivering in-facility with a skilled birth attendant and are incentivized by the JSY cash disbursement if they believe that it exceeds the additional costs associated with delivering in-facility. For these mothers, both their probability of incurring OOPE and the total amount of delivery OOPE is expected to increase with substitution toward in-facility deliveries. Out-of-pocket expenditure outcomes can therefore provide insight into which mothers are substituting toward JSY deliveries, and whether this is in line with JSY program goals.

The theory behind financial incentive programs and the role of OOPE in determining population substitution effects is applied in this paper's empirical methods. The introduction of the JSY in a district is expected to increase institutional delivery rates. Analysis of marginalized subpopulation groups are expected to show higher probabilities of delivering in-facility and incurring out-of-pocket expenditure. Lastly, populations receiving JSY payments are expected to have a higher probability of incurring OOPE and higher total out-of-pocket payments, assuming that the majority of JSY benefits are reaching poor households delivering at home. However, the JSY's impact on total OOPE is less clear due to uncertain population substitution effects.

## V. Data

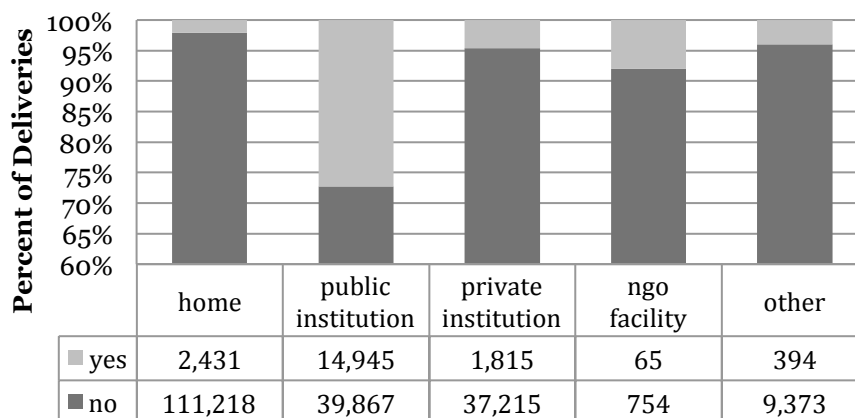
Data for empirical analysis is from the District Level Household Survey (DLHS), which has been conducted in multiple waves across India since 1998. The first round of the DLHS was conducted in 1998-99, the DLHS-2 was in 2002-04, and the DLHS-3 in 2007-08. These surveys are designed to provide indicators at the district level for the enhancement of activities under National Rural Health Mission, specifically providing indicators on maternal and child health, family planning, and other reproductive services. They are conducted through an interview process using a multi-stratified sampling design with the selection of primary sampling units, considered villages in rural areas and wards in urban areas, through probability proportion to size sampling.

This paper uses data from only the third wave of the DLHS, or the DLHS-3, for analysis. This survey includes data on births from 2004-2008. Since the JSY began implementation in 2005, all births in 2004 are considered untreated births with no JSY impact, and depending on when the JSY was implemented in each district, some births from 2005-2008 are considered untreated, and others are treated. The DLHS-3 was conducted nationwide, across 34 Indian states and union territories (excluding Nagaland). The total sample includes 720,320 households in 601 districts. Sampling methodology varied across districts according to district health outcomes. For low performing districts, 1500 households were interviewed, for medium performing, 1200 households, and for well performing districts, 1000 households. The survey incorporates several questionnaires, including a household, ever-married women (age 15-49), unmarried women (age 15-24), and village and health facility questionnaires.

Data from the household, ever married women, and village questionnaires are used in this paper. This study merges household characteristics and delivery information from the household and ever-married surveys through the creation of a district-household number unique identifier. Similarly, the data is also merged with village details from the village questionnaire through a unique district-village primary sampling unit identifier. From the 720,320 total households with 643,944 total women surveyed, women observations are dropped if they had no recorded pregnancy from 2004-2008 or if their pregnancy resulted in an abortion. Additional observations are dropped if they were

missing most delivery information, leaving a final subsample<sup>8</sup> of 218,077 observations. The following figures graphically display key trends in variables from the subsample.

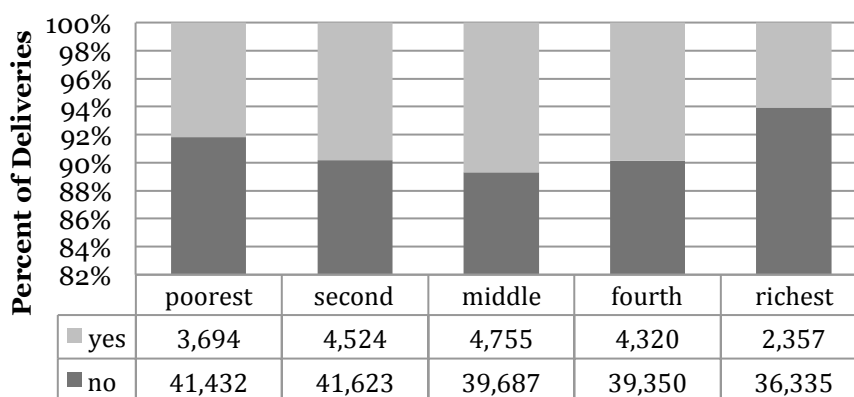
**Mothers Receiving JSY Assistance by Place of Delivery**



**Figure 2:** JSY Assistance by Delivery Place

Figure 2 displays the relationship between mothers who receive JSY assistance for delivery and their place of delivery. Most mothers receiving payments are delivering in public institutions, which is in line with the program’s focus on public facility delivery care. Only about 2 percent of mothers delivering at home are receiving JSY assistance, showing that although the program does provide cash for some home deliveries, this is neither the focus of the program nor where most of its funds are going.

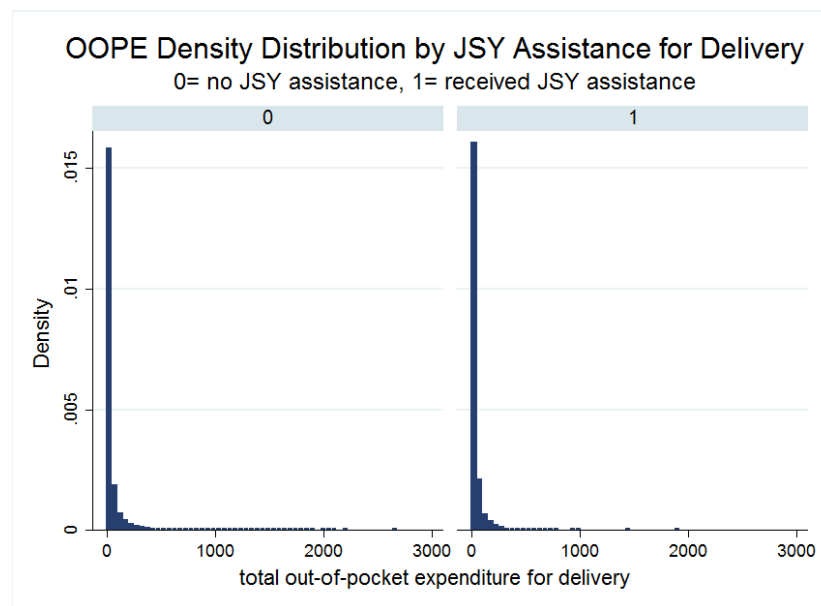
**Mothers Receiving JSY Assistance by Household Wealth Quintile**



**Figure 3:** Government Assistance and Household Wealth

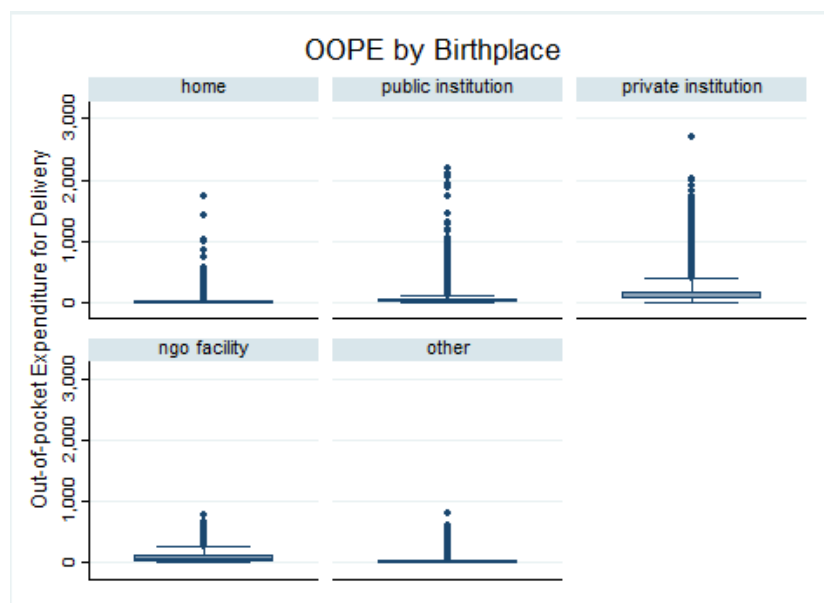
<sup>8</sup> Details of the subsample construction are found in Appendix Table 1

Figure 3 compares JSY assistance rates and household wealth. Mothers across all wealth quintiles are receive JSY payments, but a smaller percentage of the poorest are being assisted compared to households in the second, middle, and fourth wealth quintiles. The JSY was founded with the goal to increase institutional delivery rates for poor pregnant women, but data shows that India’s poorest households are not receiving the highest portion of program benefits in comparison to some of the other wealth segments. The program’s ability to target and impact the poorest segments of the population is further discussed in section VI of this paper.



**Figure 4:** Government Assistance and OOPE

Figure 4 shows how OOPE varies for mothers who receive JSY assistance for delivery in comparison to those who do not. Out-of-pocket expenditures tend to be higher overall for mothers who receive no assistance. OOPE also varies significantly across place of delivery, as shown in Figure 5 below, type of delivery procedure, and demographics such as household wealth, household class, and distance from a health facility. In total, about 14 percent of mothers spend no money on their delivery. This conveys that the distribution of out-of-pocket expenditure data is heavily skewed to the left. Because of this, the log of OOPE is taken and used for regression analysis. This creates a more normal distribution and allows for the analysis of the impact of the JSY on percent changes in out-of-pocket expenditure.



**Figure 5:** OOPE by Delivery Place

Lastly, Figure 5 conveys the relationship between out-of-pocket expenditures and the place of delivery. It is intuitive that OOPE is the highest in private institutions. It is surprising that some deliveries at public institutions and also at home have high out-of-pocket costs. These outliers in the data are likely from more expensive birthing procedures, such as those with skilled birth attendants or a caesarean delivery. Sensitivity tests were conducted to remove OOPE outliers from the dataset, but due to the large number of observations in the subsample this made no significant difference on empirical analysis and these observations were kept in the subsample.

Descriptive statistics<sup>9</sup> of the subsample show key trends in institutional delivery and OOPE outcomes across household characteristics. These statistics are useful to consider within the broader scope of empirical analysis and to understand household and gender disparities present in India.

Limitations of the DLHS are specific to this paper's goals. For each mother, multiple births are recorded since 2004, but details are provided for only the most recent birth. This means that changes in one household's delivery or out-of-pocket spending habits if

<sup>9</sup> Full descriptive statistics are found in Appendix Tables 2 and 3



they had multiple births since 2004 cannot be observed. In addition, dropping observations in the creation of a subsample limits the representative nature of the DLHS in exemplifying the entire Indian population. Considerations include the fact that mothers who had abortions may have done so because they could not afford to give birth, were unaware of the JSY program, or did not believe that the program provided enough incentive. Lastly, analysis of the impact of the JSY on delivery OOPE would be more complete if survey data included how much households actually received in cash disbursement from the program. This would further analysis for two reasons. The first is that although the JSY has set amounts of cash disbursement, this is not always what is actually disbursed to the households. The second reason is that depending on the household's costs before the program, the disbursement may or may not be fully covering costs, in which case households may behave differently than what is expected.

## VI. Empirical Specification

This paper analyzes the impact of the JSY on program utilization by delivering mothers, measured by the probability of delivering in-facility, and out-of-pocket expenditure for delivery, including the probability of incurring OOPE and changes in total OOPE. This is done through several steps in empirical analysis. First, this paper looks at the impact of the introduction of the JSY program in a district on the previously stated institutional delivery and OOPE outcomes. This is done through a difference-in-differences method. Then, additional difference-in-difference-in-differences regressions are applied to the JSY introduction analysis to observe differences in subpopulation outcomes. Finally, analysis focuses on the impact of receiving JSY program assistance. This is done through a difference-in-difference-in-differences regression that analyzes how utilizing the JSY impacts out-of-pocket expenditure. This methodology allows for the observation of population substitution effects created by the JSY program. The list of all variables used in analysis and how they are treated in regressions is shown in Appendix Table 4<sup>10</sup>.

### A. The Impact of Introducing JSY in a District

Equation (1) shows the difference-in-differences model used for the first part of analysis. The dependent variable and some covariates change across the first three regressions discussed in this section.

$$Y_{idt} = \beta_0 + \beta_1 JSY_{dt} + \beta_2 X_{idt} + \delta_d + \delta_t + \varepsilon_{idt} \quad (1)$$

This model finds the difference-in-differences between mothers who live in districts where the JSY is implemented and those where it is not dependent on district and time. The differences that occur over the two variables, district and time, are represented through one difference-in-differences estimator,  $JSY_{dt}$ , or the JSY introduction variable. Therefore,  $\beta_1$  is the estimate of the impact of the program on  $Y_{idt}$ . A key assumption of this method is that the unobservable differences between the treated and untreated groups remain constant over time. To account for some of these differences, individual-

---

<sup>10</sup> Categorical variables, such as years of mother's education, mother's age, and more are inputted into the regression as dummies with the omission of one category for each variable. Each of the categories is compared to the omitted category in the regression.

level covariates, denoted by  $X_{idt}$ , are included in the regression, as well as district and time fixed effects. Individual covariates include demographic data, such as household wealth, mother's age, mother's education, head of household's education, religion, caste, tribe, and mother's marriage age. They also include the distance of the household from the nearest health facility, and details of the delivery such as whether it was the mother's first birth, the type of delivery, place of delivery, and whether the household borrowed money for delivery. District and time fixed effects, or  $\delta_d$  and  $\delta_t$  respectively, account for time invariant inter-district unobservables and changes over time common to multiple districts.

The definition of the JSY introduction variable is an integral component of this paper's methodology. In the DLHS-3 survey, women are asked to respond to the following question: "Did you receive any government financial assistance for delivery care under the Janani Suraksha Yojana or state-specific scheme." Mazumdar (2011) discusses that due to imprecise wording of this question, this also picks up women who benefited from the National Maternity Benefit Scheme, which preceded implementation of the JSY in 2005. Therefore, JSY introduction in a district is defined as when the proportion of eligible women who receive government financial assistance is 10 percentage points greater than the 2004-2005 level. Mazumdar confirms this method against data from an independent source that surveyed health providers on whether they had provided cash to JSY beneficiaries. They accounted for the differences in reference periods of the two surveys and found an agreement between the two measures in 97.5 percent of the districts. Using this method, this paper calculates the percentage of women receiving government assistance in district  $d$  in 2004 and the additional 10-percentage point level of government assistance that qualifies the introduction of the JSY in that district (referred to from here on out as the JSY threshold level). Then, when the percentage of women receiving government assistance in district  $d$  at time  $t$  exceeds the JSY threshold level, the JSY program is defined as being introduced in that district ( $JSY = 1$ ). If the percentage of women receiving government assistance in district  $d$  at time  $t$  drops below the JSY threshold level even after the JSY has been introduced in that district, the JSY dummy variable still assumes a value of 1, since the program is implemented at that

time. This approach takes into account the variation in timing of the introduction of JSY across districts and the difference-in-differences across district and time. This paper finds that the JSY was introduced in 538 of the total 601 districts surveyed some time between 2005 and 2008. It also accounts for the fact that program utilization may change and decrease over time. This is further discussed in the results section.

This model is used for three difference-in-differences regressions. The first regression analyzes the impact of introducing the JSY in a district on the probability of delivering in-facility. The outcome of this equation,  $Y_{idt}$ , is binary, 1 if the mother delivers in an institution and 0 if she does not. Households in India, specifically BPL Indians, choose between delivering at home and delivering in an institution. To understand if women are utilizing the JSY program, the introduction of the JSY in a district should lead to a significantly positive probability of delivering in-facility. The DLHS-3 survey asks mothers to specify where their last delivery took place: in a government facility (hospital, dispensary, urban health center, community health center, primary health center, sub center, or ayush hospital/clinic), a NGO/trust hospital/clinic facility, private facility (hospital/clinic or ayush hospital/clinic), or other (on the way to hospital, at home, parents' home, work place, or other). Institutional births include all births in a government facility, NGO facility, and private facility.

The second regression equation finds the impact of introducing the JSY in a district on the probability of incurring out-of-pocket expenditure for delivering. In the DLHS-3, women are asked how much they paid for transportation to their delivery, and how much cost they incurred for delivery excluding transportation costs. The sum of these two costs totals delivery OOPE. In this regression  $Y_{idt}$  is a binary variable, 0 for no OOPE and 1 for any OOPE.

The impact of the JSY introduction on out-of-pocket expenditure is further analyzed through a third regression, with OOPE as a continuous variable. Out-of-pocket costs are deflated to 2004 prices, as also done in Mohanty (2012) through data from the Whole Sale Price Index by the Ministry of Finance in 2009. Out-of-pocket expenditures are deflated by 0.96, 0.91, 0.87, and 0.81, for 2005, 2006, 2007, and 2008, respectively.

Then, they are converted into the US dollar using the average rupee/\$ exchange rate in 2004. The log of OOPE is used as  $Y_{idt}$  to better understand percent changes in OOPE with the introduction of JSY in a district and to take into account that the distribution of OOPE that is heavily skewed to the left.

Institutional delivery and OOPE outcomes are further understood by subpopulation groups through a difference-in-difference-in-differences (DDD) method. The JSY was implemented with the goal of increasing institutional deliveries for poor households. Understanding the behaviors of subgroups of households is therefore integral to the evaluation of the JSY. The following is the DDD regression model used for analysis.

$$Y_{idt} = \beta_0 + \beta_1 JSY_{dt} + \beta_2 Z_s + \beta_3 Z_s JSY_{dt} + \beta_4 X_{idt} + \delta_d + \delta_t + \varepsilon_{idt} \quad (2)$$

This regression equation expands the original difference-in-differences model from equation (1) to include  $Z_s$ , a subpopulation group, and  $Z_s JSY_{dt}$ , the interaction of the subpopulation group with the  $JSY_{dt}$  difference-in-differences estimator. Therefore,  $\beta_3$  is the estimate of the impact of being in subpopulation  $Z_s$ , with the introduction of the JSY in your district at time  $t$ , on the outcome variable. Like equation (1), the three outcomes analyzed include the probability of delivering in-facility, the probability of incurring OOPE, and changes in OOPE. District and time fixed effects from the equation (1) remain the same, as do individual covariates. Individual covariates with high correlations to the subpopulation group, for example wealth quintile and the poorest subpopulation, are removed for that specific regression to avoid multicollinearity.

This paper looks at five subpopulations: poor households, households in a backwards class (scheduled caste or tribe), rural households, households that are far from a health facility, and households where mothers have 0 years of education. Rural household groups and households where mothers have 0 years of education are defined in the DLHS-3. For this paper, poor households are defined as those in the lowest wealth quintile. Households in a backwards class are those in a scheduled caste or scheduled tribe. Lastly, households that are “far” from a health facility are those without a

delivering facility in the same village or town, and the travel distance to the closest facility is at least 1km.

### *B. The Impact of Utilizing JSY*

One of the limitations of using a JSY introduction difference-in-differences term is that the JSY's impact on institutional delivery and OOPE outcomes is measured across all mothers on the district-level. Therefore, the relationship between receiving a financial incentive and changes in health behaviors is not always directly apparent. This paper also looks at how *receiving* a JSY payment impacts the expenditures that a household incurs. This is done through a modified difference-in-difference-in-differences approach. Here, the subpopulation is the group of mothers who receive government assistance for their delivery. This dummy is interacted with district and time, or the  $JSY_{dt}$  variable, which says whether the JSY has been introduced in district  $d$  and time  $t$ . The interaction of  $JSY_{dt}$  with mothers who receive government assistance is presented in one DDD estimator term, a JSY assistance variable. The following equation is the regression specification for this analysis.

$$Y_{idt} = \beta_0 + \beta_1 JSYassistance_{sdt} + \beta_2 X_{idt} + \delta_d + \delta_t + \varepsilon_{idt} \quad (3)$$

The JSY assistance estimator defines women who receive the JSY payment, in comparison to just having the JSY introduced in their district. The individual-level covariates and district and time fixed effects from equations (1) and (2) remain the same. Like both of these equations, this model is analyzed on three outcomes: the probability of delivering in-facility, the probability of incurring OOPE, and changes in OOPE. Here,  $\beta_1$  is the change in these outcomes for mothers who receive a JSY payment, in comparison to mothers who do not.

### *C. Results*

In this section, the results of all parts of analysis are presented. First, the results of the JSY introduction regressions are discussed, followed by the regression results of receiving JSY assistance. These regressions show the overall impact of the introduction

of JSY in a district, its impact on specific marginalized populations, and lastly the relationship between receiving a financial incentive through the JSY and out-of-pocket expenditures incurred for delivery. Table 4 shows a summary of the results on the DD estimator, subpopulation group, and DDD estimator for all of the regressions analyzing the impact JSY introduction in a district.

The first three regressions are the difference-in-differences results of the introduction of JSY in a district. The pooled regression effects of the explanatory variables on the outcomes of these regressions are significant. The full results of these regressions, including the coefficients on all individual-level covariates, and a brief discussion of the results are found in Appendix Tables 5, 6, and 7. Coefficients on these covariates communicate intuitive relationships between characteristics such as household wealth, years of mother's education, and distance to the nearest health facility on delivery and out-of-pocket expenditure outcomes. These results are in line with established patterns of facility utilization and delivery expenditures across Indian household demographics, substantiating the validity of regression results.

The coefficients on the JSY introduction variable in these difference-in-differences regressions are surprising. The introduction of the JSY is not statistically significant in any of the first three regressions, meaning that introducing JSY in district  $d$  at time  $t$  does not have a significant impact on the probability of delivering in-facility or incurring OOPE, and does not significantly impact the amount of OOPE incurred for delivery. In regression (1),  $JSY_{dt}$  is significant at the 10.9% level, with a CI(-0.19 – 1.89)<sup>11</sup>. The higher end of this confidence interval reflects results obtained in previous iterations of this regression analysis. However, when the introduction of the JSY was created into a variable that turns “on” once it is initially introduced in a district regardless of the future utilization of the program, introduction of the JSY was no longer significant and showed a much smaller effect. This suggests that overall, introducing JSY in a district does not result in a significantly increased probability of delivering in-facility because of changes in utilization of the program by mothers. In many districts, utilization of the program is

---

<sup>11</sup> CI = Confidence Interval

TABLE 4  
JSY Introduction Regression Results

N = 218,077	JSY <sub>dt</sub>	Z <sub>s</sub>	Z <sub>s</sub> *JSY <sub>dt</sub>	Constant	R-sq	F
<i>DD Analysis</i>						
(1) in-facility delivery	0.85 (0.52)			26.63*** (1.18)	0.30	346
(2) incur OOPE	0.38 (0.30)			68.46*** (1.08)	0.14	29
(3) OOPE	-1.33 (0.96)			158.93*** (3.23)	0.47	475
<i>DDD Analysis</i>						
Z <sub>s</sub> = poorest						
(1) in-facility delivery	0.39 (0.55)	-7.55*** (0.55)	2.10*** (0.58)	37.95*** (1.17)	0.29	359
(2) incur OOPE	0.35 (0.26)	-2.71*** (0.48)	0.05 (0.50)	68.48*** (1.12)	0.13	30
(3) OOPE	-1.68* (1.02)	-12.02*** (1.24)	1.64 (1.37)	498.8*** (3.30)	0.46	486
Z <sub>s</sub> = scheduled caste/tribe						
(1) in-facility delivery	0.46 (0.54)	-2.77*** (0.49)	1.10** (0.52)	26.9*** (1.18)	0.30	338
(2) incur OOPE	0.38 (0.31)	-0.32 (0.36)	-0.02 (0.38)	68.45*** (1.08)	0.14	29
(3) OOPE	-0.31 (1.02)	-4.01*** (1.18)	-2.84** (1.21)	386.43*** (3.26)	0.47	465
Z <sub>s</sub> = rural						
(1) in-facility delivery	-1.92** (0.76)	-13.75*** (1.06)	3.40*** (0.67)	28.50*** (1.24)	0.30	338
(2) incur OOPE	1.06** (0.43)	-2.83** (1.19)	-0.84* (0.43)	68.00*** (1.11)	0.14	29
(3) OOPE	-1.36 (1.74)	2.64 (3.12)	0.03 (1.70)	390.50*** (3.37)	0.47	454
Z <sub>s</sub> = far distance						
(1) in-facility delivery	0.70 (0.55)	-2.01*** (0.43)	0.39 (0.49)	26.70*** (1.18)	0.29	355
(2) incur OOPE	0.22 (0.32)	-0.45 (0.38)	0.41 (0.41)	68.55*** (1.08)	0.14	31
(3) OOPE	-2.35** (1.08)	0.50 (1.10)	2.85 (1.19)**	393.42*** (3.24)	0.47	497
Z <sub>s</sub> = no education						
(1) in-facility delivery	-0.11 (0.58)	-5.12*** (0.50)	2.05*** (0.51)	30.92*** (1.19)	0.30	337
(2) incur OOPE	0.70** (0.33)	-0.18 (0.39)	-0.70* (0.40)	68.92*** (1.10)	0.14	29
(3) OOPE	-0.68 (1.13)	-2.49** (1.15)	-1.39 (1.17)	405.40*** (3.29)	0.47	467

Coefficient estimates are significant at the \*\*\*1% level, \*\*5% level, \*10% level

Note: Regressions (1) and (2) are estimated through a linear probability model. Regression (3) is estimated through an OLS model. Robust standard errors are in parentheses, clustered at the district level (601 clusters). All regressions include individual-level covariates and district and time fixed effects, although covariates differ slightly across regressions.

(1) Institutional delivery dependent variable: dummy variable; 0 = not an in-facility birth, 1 = in-facility birth

(2) Incur OOPE dependent variable: dummy variable; 0 = no OOPE, 1 = OOPE

(3) OOPE dependent variable: continuous variable; log of OOPE

Interpretation: Regressions (1) and (2) are interpreted as percentage point changes. Regression (3) is interpreted as a percent change. Coefficient values for regression (3) have been transformed through the equation  $e^{\beta_3} - 1$  for direct interpretation of the percent change in Y for 1 unit change in the explanatory variable, by the property of log-linear regressions.



initially high, but drops to zero in future years. This can be due to poor management of the program at the district level, mother dissatisfaction with the program and a subsequent substitution away from utilization, or external factors in a district that drastically influence delivery-seeking behavior. It is not clear why this is happening, but this draws immediate attention to program management and district-level program population coverage.

Regressions (2) and (3) of the difference-in-differences analysis similarly show that introducing JSY in a district does not have a significant impact on the probability of incurring out-of-pocket expenditure or on the amount of OOPE incurred. The expectation is that with an increased probability of delivering in-facility, mothers should also face additional out-of-pocket expenditure that they previously would not have. With an insignificant impact of JSY introduction in a district on delivering in-facility, it is not surprising that data shows an insignificant impact on out-of-pocket expenditure outcomes as well.

The difference-in-differences model is expanded to interact several subpopulations with the introduction of JSY in a district. These difference-in-difference-in-differences regressions provide an understanding of the program's ability to reach marginalized population segments and how this relates to their out-of-pocket expenditures. The pooled regression effects of the explanatory variables in these regressions are significant. For most of these regressions, the subpopulation\*JSY<sub>dt</sub> estimator takes into account some of the variance in the JSY<sub>dt</sub> term, sometimes making this term significant. However, these terms do not add additional explanatory power to the regression, explaining why the overall R-squared values for the DDD regressions are very similar to the regular DD regressions.

The poorest subpopulation exhibits positive institutional delivery outcomes but inconclusive OOPE outcomes. Overall, this population has a 7.55-percentage point lower probability of delivering in-facility, but when the JSY is introduced in their district their probability of institutional deliveries increases by 2.1-percentage points. As a

population, they are less likely to incur OOPE and have 12 percent lower OOPE than their comparatively wealthier populations.

Households in a scheduled caste or tribe behave similar to the poor subpopulation in delivery-seeking behavior with the JSY and also provide significant OOPE outcomes. These households have a 2.77-percentage point lower probability of delivering in an institution than other households, but with JSY introduction their probability of delivering in-facility increases by 1.1-percentage points. They spend 4.01 percent less out-of-pocket than households not in a backwards class of society, and with JSY introduction in their district they spend 2.84 percent less. Introduction of the program therefore leads to both increased institutional deliveries by this population in comparison to other households, and subsequently higher OOPE.

Rural households see significant shifts in the probability of delivering in-facility and incurring OOPE with the introduction of the JSY. In comparison to all of the other marginalized subpopulations, rural households have the largest gap in institutional delivery outcomes. They are 13.75-percentage points less likely to deliver in-facility than urban households. With the introduction of the JSY in their district, their probability of institutional delivery increases by 3.4-percentage points. In addition, introducing JSY leads to a 1.06-percentage point greater probability of incurring OOPE. Rural households are 2.83-percentage points less likely than urban ones to incur OOPE, and when the JSY is introduced in their district they are 0.84-percentage points less likely. The increase of in-facility births with the introduction of the JSY in a district is also met with an increase in the probability of incurring OOPE, but not to the same magnitude. This suggests that some of these households may already pay some OOPE for delivery.

Households that live far from a health facility have interesting out-of-pocket expenditure results. With the introduction of JSY in a district, these households incur 2.85 percent higher out-of-pocket expenditures. Although their institutional delivery outcomes are insignificant, this is the only subpopulation with significantly higher percent of OOPE with the introduction of the JSY in comparison to other households.

This suggests that introduction of the JSY is incentivizing these households to travel for in-facility births even if they are incurring higher OOPE for delivery.

Lastly, mothers with no education exhibit similar delivery-seeking behaviors as other marginalized segments. They are 5.12-percentage points less likely to deliver in-facility than mothers with some education. With the introduction of the JSY in their district, they are 2.05-percentage points more likely to deliver in-facility.

The JSY specifically aims to increase in-facility births for the poor in India and those in scheduled castes or tribes. It also works to improve rural access to institutional deliveries through the ASHA program. Other specific marginalized segments, such as households without health facilities in their village and mothers without any education, often overlap with poor and/or rural segments, but not always. This is an important consideration when discussing the relevance of this subpopulation analysis within the scope of policy goals.

TABLE 5  
Utilizing JSY Regression Results

N = 218,077	JSY assistance	Constant	R-sq	F
<i>DDD Analysis</i>				
(1) in-facility delivery	39.39*** (1.24)	29.15*** (1.13)	0.36	389
(2) incur OOPE	1.34*** (0.43)	68.62*** (1.08)	0.14	29
(3) OOPE	-4.81*** (1.56)	387.18*** (1.58)	0.47	489

Coefficient estimates are significant at the \*\*\*1% level, \*\*5% level, \*10% level

Note: Regressions (1) and (2) are estimated through a linear probability model. Regression (3) is estimated through an OLS model. Robust standard errors are in parentheses, clustered at the district level. All regressions include individual-level covariates and district and time fixed effects, although covariates differ slightly across regressions.

(1) Institutional delivery dependent variable: dummy variable; 0 = not an in-facility birth, 1 = in-facility birth

(2) Incur OOPE dependent variable: dummy variable; 0 = no OOPE, 1 = OOPE

(3) OOPE dependent variable: continuous variable; log of OOPE

Interpretation: Regressions (1) and (2) are interpreted as percentage point changes. Regression (3) is interpreted as a percent change. Coefficient values for regression (3) have been transformed through the equation  $e^{\beta_3} - 1$  for direct interpretation of the percent change in Y for 1 unit change in the explanatory variable, by the property of log-linear regressions.

Table 5 shows a summary of the results of the JSY assistance regression on institutional delivery and OOPE outcomes. Mothers who receive JSY assistance for their delivery are 39.39 percentage points more likely to deliver in-facility. This result is not very useful. If mothers receive assistance through the JSY, the assumption is that they are delivering in-facility by the nature of the program. A portion of these women may also be receiving JSY financial assistance to deliver at home, but this portion is small as conveyed by Figure 2 in the Data section of this paper.

Results of the OOPE regressions have greater meaning. Mothers who receive JSY assistance are 1.34 percentage points more likely to incur out-of-pocket expenditure than mothers who do not. This suggests that there is a significant substitution among mothers receiving JSY payments toward incurring OOPE, or substituting away from costless delivery at home. This result shows that the JSY is successful in increasing access to facility deliveries despite increased cost implications. In addition, receiving JSY assistance leads to an overall 4.81 percent decrease in out-of-pocket expenditure. It is interesting that mothers are more likely to incur OOPE, but their actual spending is less. This is likely because the program does not only act as an incentive for mothers who previously delivered at home or with little OOPE, but also for mothers who delivered in private facilities or paid high OOPE for a skilled birth attendant at home. The program incentivizes these mothers to utilize the JSY for less expensive delivery. These mothers who are paying less with JSY assistance offset the additional out-of-pocket expenditures faced by mothers substituting away from costless delivery at home to delivering in an institution. Descriptive statistics show high utilization of the JSY among mothers of the second, third, and fourth wealth quintiles, whose in-facility delivery rates are 28, 41, and 57 percent, respectively, in comparison to the 19 percent in-facility delivery rates of the poorest segments. Combined with the results of the JSY assistance regression, these statistics communicate the large influence of these segments of the population when looking at the overall impact of the JSY.

Results of this paper's analysis differ from previous literature on the JSY because of unique empirical methods and a distinct analytical approach. Previous papers have not distinguished between the outcomes of introducing JSY in a district and receiving JSY

payments. In addition, no existing literature has studied the impact of the program on out-of-pocket expenditure outcomes, which not only provide insight on how much mothers are spending for delivery but also on the substitution effects that the program creates. Using exact matching of observations, Lim (2010) finds that on a national scale, financial assistance from the JSY leads to a 43.5 percent change in in-facility births. In high-focus states, this is even larger, at 63.8 percent, and in non-high focus states, it is much lower at 6.6 percent. Mazumdar (2011) on the other hand finds a smaller impact of the JSY using a difference-in-differences methodology. Mazumdar's results, however, are also not directly comparable to the results of this study because of his use of a JSY coverage variable. The coverage variable accounts for differences in the magnitude of JSY implementation in districts where it has already been introduced. Mazumdar finds that at full coverage, the program leads to a 12-percentage point increase in facility births. These studies also use variations in subsample construction and covariates for their analyses.

There are a few limitations to this study of the JSY. The analysis assesses the utilization of the JSY by all women, instead of all eligible women. In high focus states, all women are eligible to be JSY beneficiaries. In low focus states, however, eligibility criteria are more stringent. Data from the DLHS-3 does not allow us to make a clear distinction between eligible and non-eligible women in low focus states. Therefore, the outcome variables of this analysis are based on the total number of women. A better understanding of JSY's impact on in-facility delivery outcomes would arise with only eligible women observations. In addition, the methods of this empirical analysis focus on the overall impact of JSY introduction in a district on delivery and OOPE outcomes. Changes in population utilization of the JSY cannot be attributed to specific reasons, which would make the understanding of the program's impact more complete.

## **VII. Conclusion**

This paper aims to understand the impact of the Janani Suraksha Yojana conditional cash transfer program on mothers' probability of delivering in-facility and their delivery out-of-pocket expenditure to observe substitution effects created by the program. Using the third round of the nationwide District Level Household Survey (2007-08), this paper finds that introduction of the JSY in a district leads to insignificant changes in institutional delivery and OOPE outcomes. This is due to gaps in the program's population coverage even after it is implemented in a district. Analysis of subpopulations shows that marginalized population segments are substituting toward delivering in-facility. With the introduction of JSY in their district, their in-facility delivery rates are increasing by 1.10 – 3.40 percentage points in comparison to other households. However, the poorest populations are not necessarily receiving the bulk of JSY assistance, even though the program's goals are to increase institutional delivery rates for poor pregnant women. Lastly, the program's impact on out-of-pocket expenditure can be seen as two pronged: first, because the program incentivizes paying OOP for facility births, utilizing the program leads to a 1.34 percentage point increase in the probability of mothers incurring out-of-pocket expenditure; second, the substitution of mothers who were previously paying OOP for high quality delivery to utilizing facilities through the JSY accounts for significant decreases in out-of-pocket payments, leading to an overall decrease of 4.81 percent in out-of-pocket expenditures for mothers who utilize the program.

The conclusions of this paper have several important policy implications for the JSY and financial incentive programs overall. Previous literature and this paper both find that the JSY is successfully incentivizing mothers to deliver in-facility. However, improvements can be made to program management and population coverage at the district level. In many districts, the JSY was initially adopted by a significant percentage of mothers, but assistance percentages dropped over time. This could be due to dissatisfaction of mothers with the program. Mothers may not have been receiving the payments that they expected, or the payments may not have been a large enough incentive to outweigh the additional costs of delivering in-facility. It is possible that program outreach weakened after initial implementation, allowing coverage to drop.

Even more likely, and common in poor infrastructure areas in developing nations, is that the program is being poorly managed at the district level. JSY policies may not be fully enforced locally, leaving gaps in program implementation and leading to poor population coverage.

Findings also convey positive results for financial incentive programs such as the JSY to improve outcomes for marginalized populations, even if they are small in magnitude. This paper shows that marginalized populations are responsive JSY introduction in their district. With JSY introduction, it is seen that these populations substitute to delivering in-facility at a higher rate than other households. Poor households, households in a scheduled caste or tribe, rural households, and households with 0 years of mother's education show increased probability of delivering in-facility with JSY introduction in their district by 2.1, 1.1, 3.4, and 2.05-percentage points in comparison to other segments, respectively. All of these subpopulations additionally display patterns in health spending outcomes that are useful for further targeting of these populations. Households that live far from a facility where they can deliver have 2.85 percent higher OOPE with JSY introduction, showing that these households are willing to spend more to deliver in-facility with the JSY incentive.

Finally, it is clear that although marginalized populations are being incentivized by the JSY to deliver in-facility, other segments such as households in the second, third, and fourth wealth quintiles display greater program utilization. These households are receiving more assistance, with JSY assistance rates of 9.8, 10.7, and 9.9 percent for households in the second, third, and fourth wealth quintiles, respectively. For the poorest households, 8.1 percent are receiving some sort of JSY payment. In addition, receiving JSY payments leads to a 1.34-percentage point increase in the probability of incurring OOPE, but a 4.81 percent decrease in overall OOPE. Some households deliver at home, while others are likely to pay out-of-pocket for superior delivery services. Through JSY payments, these households are incentivized to substitute away from higher cost deliveries at other institutions to institutions with the JSY, subsequently facing less out-of-pocket expenditure with free in-facility deliveries. The overall decrease in OOPE shows that the JSY is helping households across wealth segments spend less

out-of-pocket for deliveries, but it also strengthens the argument that the program is not providing the greatest benefits to the poorest segments of the population. Specific targeting to the poor is an improvement that financial incentive programs such as the JSY can make.

The analysis of the program's impact on out-of-pocket expenditure expands upon existing knowledge of the substitution effects created by financial incentive programs. However, it is possible to debate whether these results communicate an overall positive or negative impact of the JSY on population health. This paper suggests that the program can do a better job of providing proportionally greater benefits to the poorest households. With the utilization of the JSY by mothers previously paying larger out-of-pocket sums for delivery, an overall decrease in OOPE is observed. Would policymakers be more or less satisfied if results showed an overall increase in out-of-pocket expenditure? It may substantiate a proportionally greater cost impact of mothers substituting away from costless delivery at home to in-facility deliveries. However, it could also be a negative indicator for overall household financial welfare and moves away from India's healthcare system goal to reduce the financial burden of health OOPE on households. The relationship between spending out-of-pocket for healthcare and the quality of care received is also relevant. For households substituting away from costless delivery at home, greater OOPE is associated with superior delivery care, since deliveries by a health professional, access to drugs, and medical equipment for example are all components of superior care. In this case, it can be argued that although OOPE is associated with greater financial burden, it is also an investment in better health. For mothers substituting away from other facilities to paying less with the JSY, the institution with superior care is less certain. Discussion of this paper's results conveys opportunities for further research on OOPE, specifically its associations with quality of care and future health outcomes for additional insight into out-of-pocket spending and the workings of financial incentive programs.



## Appendices

APPENDIX TABLE 1 Selection of Subsample	
Selection Criteria	Number of Observations
Full sample	643,944
<i>No birth outcome</i>	
No pregnancy or birth recorded	- 415,597
Pregnancy resulted in abortion	- 10,156
<i>Missing data</i>	
Delivery information	- 114
<b>Total Subsample</b>	<b>218,077</b>

APPENDIX TABLE 2 Descriptive Statistics of Regression Outcomes					
	Obs	Mean	Std Dev	Min	Max
delivery	218077	0.43	0.50	0.00	1.00
expenditure	218077	0.86	0.35	0.00	1.00
OOPE	218077	40.93	85.92	0.00	2686.37

APPENDIX TABLE 3  
Descriptive Statistics of Explanatory Variables on Regression Outcomes

EXPLANATORY VARIABLE		Obs	Delivery (%)		OOPE (%)		OOPE (\$)	
			Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
<i>Differences Estimators</i>								
jsy	no jsy	67955	0.40	0.49	0.86	0.35	42.13	88.03
	jsy introduced	150122	0.45	0.50	0.86	0.35	40.39	84.94
poorestjsy	not poorestjsy	186063	0.47	0.50	0.87	0.34	45.33	91.00
	poorestjsy	32014	0.21	0.41	0.79	0.41	15.40	37.27
ruraljsy	not ruraljsy	94942	0.49	0.50	0.88	0.33	50.80	100.08
	ruraljsy	123135	0.39	0.49	0.84	0.36	33.33	72.24
scheduledjsy	not scheduledjsy	161665	0.46	0.50	0.87	0.33	45.73	91.59
	scheduledjsy	56412	0.37	0.48	0.81	0.39	27.18	65.13
farjsy	not farsjy	164656	0.47	0.50	0.86	0.34	44.84	91.33
	farjsy	53421	0.34	0.47	0.85	0.36	28.89	65.07
educationjsy	not educationjsy	150443	0.51	0.50	0.87	0.33	50.25	96.97
	educationjsy	67634	0.27	0.44	0.82	0.38	20.22	47.58
jsyassistance	no jsyassistance	198427	0.39	0.49	0.85	0.36	41.19	87.64
	jsyassistance	19650	0.86	0.35	0.94	0.24	38.32	65.96
<i>Subpopulations</i>								
poorest	not poorest	172951	0.50	0.50	0.88	0.33	47.67	93.32
	poorest	45126	0.19	0.39	0.78	0.41	15.11	38.11
rural	not rural	40625	0.71	0.45	0.93	0.25	73.73	123.38
	rural	177452	0.37	0.48	0.84	0.36	33.43	72.69
scheduled	not scheduled	136855	0.48	0.50	0.89	0.32	49.08	95.78
	scheduled	81222	0.35	0.48	0.81	0.39	27.20	63.74
far	not far	139821	0.50	0.50	0.87	0.34	47.80	95.00
	far	78256	0.32	0.47	0.85	0.36	28.67	64.88
m_noeduc	has education	119639	0.59	0.49	0.89	0.31	57.96	104.26
	no education	98438	0.25	0.43	0.82	0.38	20.24	48.60
govtassistance	no govtassistance	195608	0.39	0.49	0.85	0.36	41.20	87.89
	govtassistance	22469	0.84	0.37	0.94	0.25	38.61	66.30
<i>Individual-level covariates</i>								
m_age	younger than 20	26148	0.43	0.50	0.87	0.34	35.95	73.77
	20-24	87349	0.47	0.50	0.87	0.34	42.35	83.29
	25-29	63742	0.44	0.50	0.86	0.35	43.76	91.67
	30-34	27326	0.37	0.48	0.84	0.37	40.23	93.42
	35 and older	13512	0.28	0.45	0.81	0.39	29.54	79.00
m_educ	0	98438	0.25	0.43	0.82	0.38	20.24	48.60
	1-5	32316	0.39	0.49	0.84	0.36	30.54	64.48
	6-11	65626	0.61	0.49	0.90	0.31	54.74	96.87
	>= 12	21697	0.84	0.37	0.94	0.24	108.53	147.15
h_educ	0	53880	0.23	0.42	0.81	0.39	19.28	48.50
	1-5	34608	0.33	0.47	0.83	0.38	25.56	56.79
	6-11	91603	0.48	0.50	0.88	0.33	43.15	83.95
	>= 12	37986	0.69	0.46	0.92	0.28	80.31	129.10

EXPLANATORY VARIABLE		Obs	Delivery (%)		OOPE (%)		OOPE (\$)	
			Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
livebirths	0	6004	0.43	0.49	0.83	0.38	44.36	95.72
	1	159135	0.45	0.50	0.86	0.35	44.74	90.95
	2	50432	0.37	0.48	0.85	0.35	29.35	66.22
	3	2455	0.34	0.47	0.85	0.36	24.16	54.52
	>=4	51	0.47	0.50	0.82	0.39	35.67	73.41
hindu	not hindu	53906	0.42	0.49	0.85	0.36	40.93	83.91
	hindu	164171	0.44	0.50	0.86	0.35	40.94	86.57
muslim	not muslim	186765	0.44	0.50	0.86	0.35	41.03	86.36
	muslim	31312	0.40	0.49	0.87	0.34	40.33	83.25
christian	not christian	206398	0.43	0.50	0.86	0.34	41.28	86.39
	christian	11679	0.42	0.49	0.78	0.41	34.75	76.82
caste	none	177346	0.44	0.50	0.86	0.35	42.96	89.36
	scheduled caste	40731	0.39	0.49	0.87	0.34	32.11	68.23
tribe	none	177586	0.46	0.50	0.88	0.32	45.19	90.49
	scheduled tribe	40491	0.31	0.46	0.75	0.43	22.27	58.47
first birth	not first birth	148441	0.36	0.48	0.84	0.36	32.46	73.79
	first birth	69636	0.60	0.49	0.89	0.31	58.99	105.04
distance	rural with facility	99203	0.41	0.49	0.84	0.37	37.17	78.04
	rural & 1-5km							
	from facility	63113	0.33	0.47	0.85	0.35	29.72	67.14
	rural & 6-10 km							
	from facility	11970	0.28	0.45	0.82	0.39	25.46	56.58
	rural & >10 km							
	from facility	3178	0.24	0.43	0.78	0.42	20.67	50.88
	urban	40613	0.71	0.45	0.93	0.25	73.70	123.29
wealth	poorest	45126	0.19	0.39	0.78	0.41	15.11	38.11
	second	46147	0.28	0.45	0.82	0.38	21.66	49.45
	third	44442	0.41	0.49	0.85	0.35	31.37	66.38
	fourth	43670	0.57	0.50	0.91	0.29	49.71	89.35
	richest	38692	0.79	0.41	0.94	0.24	95.12	136.29
delvrytype	normal	196360	0.38	0.48	0.85	0.36	26.15	49.73
	caesarean	17728	0.96	0.19	0.97	0.18	196.35	182.92
	by instrument	3989	0.90	0.30	0.96	0.18	77.91	116.91
delvryplace	home	113649	0.00	0.00	0.77	0.42	11.06	20.29
	public facility	54812	1.00	0.00	0.96	0.19	42.01	66.87
	private facility	39030	1.00	0.00	0.98	0.12	131.28	149.18
	ngo facility	819	1.00	0.00	0.95	0.22	98.45	117.81
	other	9767	0.00	0.00	0.80	0.40	16.62	31.12
marriageage	0-15	59240	0.26	0.44	0.84	0.37	22.11	54.48
	16-20	122277	0.44	0.50	0.86	0.35	38.42	79.91
	21-25	30916	0.68	0.46	0.90	0.31	75.69	120.08
	>25	5644	0.76	0.43	0.89	0.31	102.52	149.93
borrowed	no	154614	0.41	0.49	0.81	0.40	34.44	76.94
	yes	63463	0.50	0.50	0.99	0.10	56.76	102.91

APPENDIX TABLE 4  
Definition of Regression Variables

Variable	Definition	Variable	Definition
<b>DEPENDENT VARIABLES</b>			
delivery expenditure	1 if delivery was in-facility 1 if individual spent out-of-pocket for delivery	lgOOPE	Log individual out-of-pocket expenditure for delivery
<b>INDEPENDENT VARIABLES</b>			
<i>Difference estimators</i>			
jsy	1 if JSY is implemented in district $d$ at time $t$	poorestjsy	1 if in poorest wealth quintile & JSY is implemented at $d, t$
farjsy	1 if live far from facility & JSY is implemented at $d, t$	ruraljsy	1 if rural household & JSY is implemented at $d, t$
educationjsy	1 if 0 yrs of m_educ & JSY implemented at $d, t$	scheduledjsy	1 if scheduled caste or tribe & JSY implemented at $d, t$
jsyassistance	1 if receive govt assistance & JSY implemented at $d, t$		
<i>Subpopulations</i>			
far	1 if live far from facility	poorest	1 if in poorest wealth quintile
education	1 if 0 yrs of m_educ	rural	1 if rural household
scheduled	1 if scheduled caste or tribe	govtassistance	1 if receive govt assistance
<i>Individual-level covariates</i>			
m_age	1 if younger than 20 yrs old, omitted 1 if 20-24 yrs old 1 if 25-29 yrs old 1 if 30-34 yrs old 1 if 40 and older yrs old	caste	1 if scheduled caste
		tribe	1 if scheduled tribe
		wealth	1 if poorest, omitted 1 if second 1 if middle 1 if fourth 1 if richest
m_educ	1 if 0 yrs educ, omitted 1 if 1-5 yrs education 1 if 6-11 yrs education 1 if $\geq 12$ yrs education	delvrytype	1 if normal, omitted 1 if caesarean 1 if by instrument
h_educ	1 if 0 yrs educ, omitted 1 if 1-5 yrs education 1 if 6-11 yrs education 1 if $\geq 12$ yrs education	delvryplace	1 if home 1 if public institution 1 if private institution 1 if other, omitted
hindu	1 if hindu	marriageage	1 if 11-20 yrs old 1 if 21-30 yrs old 1 if $>30$ yrs old
muslim	1 if muslim		
christian	1 if christian	borrowed	1 if borrowed money for delivery
firstbirth	1 if mother's first birth		
distance	1 if rural with facility 1 if rural & 1-5km from facility 1 if rural & 6-10km 1 if rural & $>10$ km 1 if urban, omitted	livebirths	1 if 0 live births, omitted 1 if 1 live birth 1 if 2 live births 1 if 3 live births 1 if $\geq 4$ live births

APPENDIX TABLE 5  
 JSY Introduction Full Regression Results; Dependent Variable: delivering in-facility

		Coefficient Estimate	Robust Std Err	95% Confidence Interval	
jsy		0.0085	0.0053	-0.0019	0.0189
m_age					
	20-24	-0.0015	0.0034	-0.0081	0.0051
	25-29	-0.0084**	0.0040	-0.0162	-0.0006
	30-34	-0.0087	0.0046	-0.0177	0.0004
	35 and older	-0.0146***	0.0054	-0.0252	-0.0041
livebirths					
	1	-0.0337***	0.0058	-0.0451	-0.0224
	2	-0.0561***	0.0061	-0.0680	-0.0442
	3	-0.0677***	0.0112	-0.0896	-0.0458
	>=4	0.0422	0.0608	-0.0773	0.1616
h_educ					
	1-5	0.0115***	0.0028	0.0061	0.0170
	6-11	0.0381***	0.0028	0.0327	0.0436
	>=12	0.0675***	0.0040	0.0596	0.0754
m_educ					
	1-5	0.0369***	0.0031	0.0307	0.0430
	6-11	0.1069***	0.0038	0.0995	0.1143
	>=12	0.1617***	0.0052	0.1515	0.1718
marriageage					
	16-20	0.0281***	0.0027	0.0228	0.0334
	21-25	0.0633***	0.0040	0.0555	0.0711
	>25	0.0552***	0.0069	0.0416	0.0688
hindu		-0.0137*	0.0079	-0.0292	0.0018
muslim		-0.0519***	0.0091	-0.0697	-0.0341
christian		-0.0167	0.0116	-0.0394	0.0060
scheduledcaste		-0.0201***	0.0032	-0.0265	-0.0137
scheduledtribe		-0.0764***	0.0053	-0.0869	-0.0659
firstbirth		0.0726***	0.0030	0.0666	0.0786
wealth					
	second	0.0337***	0.0029	0.0280	0.0395
	middle	0.0758***	0.0042	0.0676	0.0840
	fourth	0.1389***	0.0055	0.1281	0.1497
	richest	0.2215***	0.0062	0.2094	0.2336
distance					
	rural with facility	-0.0723***	0.0047	-0.0816	-0.0630
	rural & 1-5km from facility	-0.0695***	0.0052	-0.0797	-0.0593
	rural & 6-10km from facility	-0.0960***	0.0068	-0.1094	-0.0826
	rural & >10km from facility	-0.1148***	0.0095	-0.1335	-0.0961
delvrytype					
	caesarean	0.3107***	0.0095	0.2921	0.3294
	by instrument or assisted	0.4005***	0.0130	0.3749	0.4261
constant		0.2663***	0.0118	0.2432	0.2894
Observations		218077			
Number of groups		601			
R-squared		0.2965			
F(38,600)		346.24			

Coefficient estimates are significant at the \*\*\*1% level, \*\*5% level, \*10% level

Regression details: The dependent variable of the regression is binary, 0 = not an in-facility birth, 1 = in-facility birth. Regression is estimated through a linear probability model. Robust standard errors are clustered at the district level. District and time fixed effects are included.

Interpretation: Coefficients are interpreted as percentage point changes

*Brief Discussion:*

Most individual-level covariates are significant at the 1 percent level, and if not the 5 percent level, except for some mother's age categories, 4 or more live births, and being Christian, which are not significant at all. The coefficient estimates for significant covariates in this regression are generally very intuitive. For both the head of the household and mother's education, the probability of delivering in an institution increases significantly with greater years of education. Compared to 0 years of education, the mother's probability of delivering in an institution increases by 6.75 and 16.17-percentage points with 12 or more years of the head of the household's education and mother's education, respectively. The impact of the mother's education is greater, which is in line with theories linking women's education to autonomy of choice, contraceptive use, and other development measures. Mothers having their first birth have a 7.26-percentage point increased probability of delivering in-facility. Compared to the poorest wealth quintile, mothers have an increasingly higher percent chance of utilizing institutions as their wealth increases. The richest population has over a 22-percentage point higher probability of having an in-facility birth than the poorest. Lastly, compared to mothers living in an urban location, all rural mothers have a lower probability of delivering in an institution. Mothers living over 10km away from a delivery facility are 11.5-percentage points less likely to deliver in-facility.

APPENDIX TABLE 6

JSY Introduction Full Regression Results; Dependent Variable: incurring out-of-pocket expenditure

		Coefficient Estimate	Robust Std Err	95% Confidence Interval	
jsy		0.0038	0.0030	-0.0021	0.0096
m_age					
	20-24	0.0000	0.0024	-0.0047	0.0047
	25-29	0.0006	0.0028	-0.0049	0.0061
	30-34	-0.0035	0.0033	-0.0099	0.0029
	35 and older	-0.0074*	0.0045	-0.0163	0.0014
livebirths					
	1	0.0249***	0.0045	0.0160	0.0337
	2	0.0249***	0.0048	0.0155	0.0342
	3	0.0205*	0.0079	0.0049	0.0361
	>=4	-0.0092	0.0441	-0.0959	0.0774
h_educ					
	1-5	0.0058**	0.0028	0.0004	0.0113
	6-11	0.0125***	0.0024	0.0078	0.0171
	>=12	0.0130***	0.0030	0.0070	0.0190
m_educ					
	1-5	0.0067***	0.0025	0.0018	0.0116
	6-11	0.0188***	0.0025	0.0139	0.0237
	>=12	0.0202***	0.0036	0.0132	0.0272
marriageage					
	16-20	0.0045**	0.0022	0.0002	0.0089
	21-25	0.0093***	0.0033	0.0027	0.0159
	>25	0.0169***	0.0054	0.0063	0.0275
hindu		-0.0007	0.0064	-0.0133	0.0118
muslim		0.0003	0.0073	-0.0141	0.0147
christian		-0.0155	0.0112	-0.0374	0.0065
scheduledcaste		-0.0033	0.0023	-0.0079	0.0012
scheduledtribe		-0.0356***	0.0050	-0.0455	-0.0257
firstbirth		0.0092***	0.0023	0.0048	0.0137
wealth					
	second	0.0153***	0.0028	0.0097	0.0208
	middle	0.0352***	0.0034	0.0286	0.0418
	fourth	0.0554***	0.0039	0.0477	0.0631
	richest	0.0598***	0.0046	0.0508	0.0687
distance					
	rural with facility	-0.0092***	0.0030	-0.0151	-0.0034
	rural & 1-5km from facility	-0.0071**	0.0036	-0.0141	0.0000
	rural & 6-10km from facility	-0.0135**	0.0060	-0.0253	-0.0017
	rural & >10km from facility	-0.0340***	0.0118	-0.0572	-0.0108
delvryplace					
	public institution	0.1715***	0.0071	0.1576	0.1854
	private institution	0.1413***	0.0066	0.1283	0.1542
	ngo facility	0.1508***	0.0128	0.1256	0.1761
	other	0.0061	0.0066	-0.0068	0.0190
delvrytype					
	caesarean	-0.0163***	0.0024	-0.0209	-0.0116
	by instrument or assisted	0.0007	0.0069	-0.0129	0.0142
borrowed		0.1460***	0.0058	0.1347	0.1574
constant		0.6846	0.0108	0.6634	0.7058
Observations		218077			
Number of groups		601			
R-squared		0.1361			

F(43,600)

29.48

---

Coefficient estimates are significant at the \*\*\*1% level, \*\*5% level, \*10% level

Regression details: The dependent variable of the regression is binary, 0 = did not incur OOPE for delivery, 1 = incurred OOPE for delivery. Regression is estimated through a linear probability model. Robust standard errors are clustered at the district level. District and time fixed effects are included.

Interpretation: Coefficients are interpreted as percentage point changes

### *Brief Discussion:*

A larger chunk of covariates are insignificant in this regression in comparison to the previous one. Some coefficients show some surprising results, and others are very intuitive. The probability of incurring OOPE increases with the head of household's years of education, mother's years of education, and wealth quintile. These patterns were similarly seen in the previous regression with the dependent variable in-facility births. This indicates that incurring OOPE and delivering in-facility move together based on these household characteristics. Members of a scheduled tribe have a 3.6-percentage point smaller chance of incurring OOPE. This regression shows no clear relationship between both mother's age and religion dummies Hindu, Muslim, and Christian with incurring OOPE. Some results worth discussing include the coefficients on the distance variables, which are all negative. This is surprising because the expectation is that mothers in rural households face higher OOPE since they live farther from health facilities. These mothers may have a lower probability of incurring OOPE when they live in a rural location instead of urban because they are overall less likely to deliver in-facility and incur OOPE in the first place.



APPENDIX TABLE 7

JSY Introduction Full Regression Results; Dependent Variable: out-of-pocket expenditure

		Coefficient Estimate	Robust Std Err	95% Confidence Interval	
jsy		-0.0134	0.0096	-0.0323	0.0055
m_age					
	20-24	-0.0008	0.0083	-0.0170	0.0155
	25-29	-0.0088	0.0094	-0.0273	0.0098
	30-34	-0.0364***	0.0109	-0.0577	-0.0150
	35 and older	-0.0606***	0.0131	-0.0863	-0.0349
livebirths					
	1	-0.0713***	0.0151	-0.1009	-0.0417
	2	-0.0932***	0.0160	-0.1247	-0.0617
	3	-0.0982***	0.0255	-0.1482	-0.0481
	>=4	-0.0068	0.1357	-0.2733	0.2597
h_educ					
	1-5	0.0183**	0.0076	0.0034	0.0332
	6-11	0.0755***	0.0071	0.0616	0.0895
	>=12	0.1392***	0.0101	0.1194	0.1591
m_educ					
	1-5	0.0351***	0.0079	0.0196	0.0505
	6-11	0.0886***	0.0080	0.0729	0.1044
	>=12	0.1861***	0.0130	0.1606	0.2116
marriageage					
	16-20	0.0281***	0.0069	0.0146	0.0416
	21-25	0.0705***	0.0109	0.0492	0.0918
	>25	0.1199***	0.0208	0.0790	0.1609
hindu		0.0044	0.0199	-0.0348	0.0435
muslim		0.0001	0.0220	-0.0431	0.0433
christian		-0.0497*	0.0271	-0.1029	0.0036
scheduledcaste		-0.0610***	0.0078	-0.0763	-0.0457
scheduledtribe		-0.1076***	0.0122	-0.1316	-0.0837
firstbirth		0.1107***	0.0081	0.0949	0.1265
wealth					
	second	0.0786***	0.0077	0.0635	0.0937
	middle	0.1373***	0.0096	0.1185	0.1561
	fourth	0.2449***	0.0120	0.2213	0.2686
	richest	0.3902***	0.0149	0.3609	0.4195
distance					
	rural with facility	0.0667***	0.0129	0.0414	0.0921
	rural & 1-5km from facility	0.0797***	0.0140	0.0522	0.1072
	rural & 6-10km from facility	0.0792***	0.0177	0.0444	0.1139
	rural & >10km from facility	0.0262	0.0298	-0.0324	0.0849
delvryplace					
	public institution	0.7287***	0.0237	0.6823	0.7752
	private institution	1.7476***	0.0228	1.7028	1.7923
	ngo facility	1.3647***	0.0674	1.2324	1.4971
	other	0.1843***	0.0174	0.1502	0.2184
delvrytype					
	caesarean	0.9173***	0.0175	0.8830	0.9516
	by instrument or assisted	0.3358***	0.0236	0.2894	0.3822
borrowed		0.6107***	0.0108	0.5895	0.6318
constant		1.5893***	0.0323	1.5258	1.6528
Observations		218077			
Number of groups		601			
R-squared		0.4659			

F(43,600)

475.37

---

Coefficient estimates are significant at the \*\*\*1% level, \*\*5% level, \*10% level

Regression details: The dependent variable of this regression is the log of OOPE. Regression is estimated through an OLS regression model. Robust standard errors are clustered at the district level. District and time fixed effects are included.

Interpretation: Coefficients are interpreted as percent changes.

*Brief Discussion:*

Out-of-pocket expenditure is expected to increase significantly with increased education of both the head of the household and the mother. Mothers from a scheduled caste and scheduled tribe are expected to spend 6.10 and 10.76 percent less OOP for delivery, respectively. This makes sense because they are from backwards segments of society with a history of poverty and traditional values. The wealthiest segments of society are expected to spend 39.02 percent more than the poorest segments. All rural mothers increase their spending by 2.62-7.97 percent more than urban mothers. This is likely due to higher transportation costs. Mothers who deliver in a public institution, private institution, and NGO facility spend 72.87, 174.75.4, and 136.47 percent more, respectively, than those who deliver at home. Caesarean deliveries cause a change in OOPE of 91.73 percent. These results are all very intuitive.

## References

- Anderson, I., Axelson, H., & Tan, B. (2011). The other crisis: The economics and financing of maternal, newborn and child health in asia. *Health Policy and Planning, 26*(4), 288-297. doi:<http://heapol.oxfordjournals.org/content/by/year>
- Berman, P. A. (1998). Rethinking health care systems: Private health care provision in india. *World Development, 26*(8), 1463-1479. doi:[http://dx.doi.org/10.1016/S0305-750X\(98\)00059-X](http://dx.doi.org/10.1016/S0305-750X(98)00059-X)
- Bonu, S., Bhushan, I., Rani, M., & Anderson, I. (2009). Incidence and correlates of 'catastrophic' maternal health care expenditure in india. *Health Policy and Planning, 25*(6), 445-456.
- Carvalho, N., Thacker, N., Gupta, S., & Saloman, J. (2014). More Evidence on the Impact of India's Conditional Cash Transfer Program, Janani Suraksha Yojana: Quasi- Experimental Evaluation of the Effects on Childhood Immunization and Other Reproductive and Child Health Outcomes. *9*(10), 1-13. Retrieved November 1, 2014, from <http://www.plosone.org/article/fetchObject.action?uri=info:doi/10.1371/journal.pone.0109311&representation=PDF>
- Coady, D., author. (2012). In Clements B. J.,author., Gupta S.,author. (Eds.), *The economics of public health care reform in advanced and emerging economies*. Washington: International Monetary Fund June 2012.
- DATTA, A. (2009). Public-private partnerships in india: A case for reform? *Economic and Political Weekly, 44*(33), 73-78. Retrieved from <http://www.jstor.org/stable/25663449>
- De Costa, A., & Diwan, V. (2007). 'Where is the public health sector?': Public and private sector healthcare provision in madhya pradesh, india. *Health Policy, 84*(2-3), 269-276. doi:<http://dx.doi.org/10.1016/j.healthpol.2007.04.004>
- De Costa, A., Jehan, K., Sidney, K., & Smith, H. (2012, May). Improving access to maternity services: an overview of cash transfer and voucher schemes in South Asia. *Reproductive Health Matters, 20*(39), 142+. Retrieved from [http://go.galegroup.com.proxy.lib.duke.edu/ps/i.do?id=GALE%7CA296571545&v=2.1&u=duke\\_perkins&it=r&p=AONE&sw=w&asid=40e4632c3b2beca92d6a7af07ad1bf8b](http://go.galegroup.com.proxy.lib.duke.edu/ps/i.do?id=GALE%7CA296571545&v=2.1&u=duke_perkins&it=r&p=AONE&sw=w&asid=40e4632c3b2beca92d6a7af07ad1bf8b)
- DLHS-3. (n.d.). Retrieved September 25, 2014, from <http://www.rchiips.org/PRCH-3.html>
- Ever Married Woman's (15-49) Questionnaire. (n.d.). Retrieved October 28, 2014, from [http://www.rchiips.org/pdf/rch3/Questionnaire/2\\_Ever married Questionnaire.pdf](http://www.rchiips.org/pdf/rch3/Questionnaire/2_Ever married Questionnaire.pdf)

- Goli, S., & Arokiasamy, P. (2014). Trends in health and health inequalities among major states of India: Assessing progress through convergence models. *Health Economics, Policy and Law*, 9(02), 143-168. Retrieved September 9, 2014, from [http://journals.cambridge.org/abstract\\_S1744133113000042](http://journals.cambridge.org/abstract_S1744133113000042)
- Gottret, P., & Schieber, G. (2006, January 1). Health Financing Revisited: A Practitioner's Guide. Retrieved March 27, 2015, from <http://siteresources.worldbank.org/INTHSD/Resources/topics/Health-Financing/HFRFull.pdf>
- Health expenditure per capita (current US\$). (2014). Retrieved from <http://data.worldbank.org/indicator/SH.XPD.PCAP>
- Health expenditure, total (% of GDP). (2014). Retrieved from [http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS?order=wbapi\\_data\\_value\\_2012+wbapi\\_data\\_value+wbapi\\_data\\_value-last&sort=asc](http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS?order=wbapi_data_value_2012+wbapi_data_value+wbapi_data_value-last&sort=asc)
- Kabeer N, Piza C, Taylor L (2012) *What are the economic impacts of conditional cash transfer programmes? A systematic review of the evidence. Technical report.* London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- Kawabata, K., Xu, K., & Carrin, G. (2002). Preventing impoverishment through protection against catastrophic health expenditure. *Bulletin of World Health Organization*, 80(8), 612-612. Retrieved November 3, 2014, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2567587/>
- Lim, S. S., Dandona, L., Hoisington, J. A., James, S. L., Hogan, M. C., & Gakidou, E. (2010). India's janani suraksha yojana, a conditional cash transfer programme to increase births in health facilities: An impact evaluation. *The Lancet*, 375(9730), 2009-2023. doi:[http://dx.doi.org/10.1016/S0140-6736\(10\)60744-1](http://dx.doi.org/10.1016/S0140-6736(10)60744-1)
- Majumder, A., & Upadhyay, V. (2004). An Analysis of the Primary Health Care System in India with Focus on Reproductive Health Care Services. *Artha Beekshan*, 12(4), 29-38. Retrieved December 3, 2014, from
- Mavalankar, D. State of maternal health in india. Retrieved from <http://www.azadindia.org/social-issues/maternal-health-in-india.html>
- Mazumdar, S., Mills, A., & Powell-Jackson, T. (2011). Financial Incentives in Health: New Evidence from India's Janani Suraksha Yojana. Retrieved October 27, 2014, from [http://www.herc.ox.ac.uk/people/exstaff/tpowelljackson/financial incentives in health](http://www.herc.ox.ac.uk/people/exstaff/tpowelljackson/financial%20incentives%20in%20health)
- Modugu, H. R., Kumar, M., Kumar, A., & Millett, C. (2012). State and socio-demographic group variation in out-of-pocket expenditure, borrowings and janani

suraksha yojana (JSY) programme use for birth deliveries in india. *BMC Public Health*, 12, n/a-1048. doi:<http://dx.doi.org.proxy.lib.duke.edu/10.1186/1471-2458-12-1048>

- Mohanan, M., Bauhoff, S., La Forgia, G., Babiarz, K. S., Singh, K. & Miller, G. (2013). Effect of *chiranjeevi yojana* on institutional deliveries and neonatal and maternal outcomes in gujrat, india: A difference-in-differences analysis.
- Mohanty, S. K., & Srivastava, A. (2013). Out-of-pocket expenditure on institutional delivery in india. *Health Policy and Planning*, 28(3), 247-262. doi:<http://heapol.oxfordjournals.org/content/by/year>
- Nath, A. (2011). India's Progress Toward Achieving the Millennium Development Goals. *Indian Journal of Community Medicine*, 36(2), 85-92. Retrieved December 3, 2014, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3180952/>
- Pal, R. (2012). Measuring incidence of catastrophic out-of-pocket health expenditure: With application to india. *International Journal of Health Care Finance and Economics*, 12(1), 63-85. doi:<http://dx.doi.org/10.1007/s10754-012-9103-4>
- Population of India (2014) - Worldometers. (n.d.). Retrieved November 17, 2014, from <http://www.worldometers.info/world-population/india-population/>
- Ray, S. (2014). An index of maternal and child healthcare status in india: Measuring inter- and intra-state variations from capability perspectives. *Social Indicators Research*, 117(1), 195-207. doi:<http://link.springer.com/journal/volumesAndIssues/11205>
- Roberts, S. (2009, December 15). In 2025, India to Pass China in Population, U.S. Estimates. Retrieved March 22, 2015, from [http://www.nytimes.com/2009/12/16/world/asia/16census.html?\\_r=0](http://www.nytimes.com/2009/12/16/world/asia/16census.html?_r=0)
- Rosenberg, D. (1997, December 1). "Trend Analysis and Interpretation: Key Concepts for Maternal and Child Health Professionals". Retrieved September 9, 2014, from <http://mchb.hrsa.gov/publications/pdfs/trendanalysis.pdf>
- Singh, M. (2014, July 7). New poverty line: Rs 32 in villages, Rs 47 in cities. *The Times of India*. Retrieved November 3, 2014, from <http://timesofindia.indiatimes.com/india/New-poverty-line-Rs-32-in-villages-Rs-47-in-cities/articleshow/37920441.cms>
- United Nations Millennium Development Goals. (n.d.). Retrieved March 22, 2015, from <http://www.un.org/millenniumgoals/>
- Vora, K., Mavalankar, D., Ramani, K. V., Upadhyaya, M., Sharma, B., Iyengar, S., . . . Iyengar, K. (2009). Maternal health situation in india: A case study. *Journal of Health, Population, and Nutrition*, 27(2), 184-201. Retrieved October 1, 2014, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2761784/?report=classic>